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Ph.D. thesis

ELECTION TIMING IN CONSENSUAL SYSTEMS.
LINKING COALITION BARGAINING AND VALENCE THEORY OF PARTY COMPETITION.

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Foreword

This thesis is the outcome of a long process, that started from an interest for game theory and formal models of legislatures on one side, and institutional theory on the other. I have always been fascinated by the complex relations between cabinet and parliaments, and how they variate across different political systems.

The first works on election timing, starting from the first games developed by Diermeier and colleagues, up to Lupia and Strøm, impressed me significantly. It is thanks to this literature that I was able to add a temporal dimension to my mental picture of parliamentary polities. At the same time, reading Joel Watson's manual of game theory I was extremely fascinated by the class of bargaining games, especially by the Rubinstein non-cooperative solution, superior to Nash's cooperative model, that I reluctantly excluded from the later versions of the formal model. It was by observing the simplest models of bargaining between two players that I imagined the solution of my future formal model. Its fundamental intuition lied in allowing the game's exit option through the bargaining space, which could be split into sectors based on the current allocation of benefits, each of which corresponded to a particular outcome of the game.

My goal was not just modeling a standard bargaining game with an exit option, but also to include time in it. Formal models of multiparty systems produced before the present research didn't describe the effects of the effects of time on the players' negotiations. The first attempts have been frustrating. The first versions of the model, assuming continuous time, were rich of complex utility equations and optimal stopping problems that were based on controverse assumptions on players' preferences and added unnecessary weights to the model. At some point, I figured I had to choose

between two unhappy choices: semplifying the model dramatically, making it overly simplistic, or complicating it at the point of making it completely unmanageable? Reading Kayser's 2005 paper on the determinants of opportunistic election timing in majoritarian systems was the turning point. Kayser was inspired by the Bellman principle of optimality in order to describe the decision of a government party to call a snap election. His continuation values represented and indespensable example that allowed me to dramatically simplify the mathematics of my game.

Parallel to my interest in election timing, I was captured by spatial models of party competition and policymaking. I always had a great passion for this topic since my undergraduate studies of Anthony Down's economical theory of democracy. In particular, I was fascinated by the literature on valence issues. I was especially impressed by Tim Groseclose's model. It proved to me that it was possible to drastically improve downsian model with very few additional elements, and correcting their most important flaws at the same. For long time I had a feeling that it was possible to link thes two fundamental topics treated in the present thesis, opportunistic election timing and valence issues in party competition, but I couldn't find a way to do it. Then, during my stay in Ann Arbor, Michigan, I read the works of Luigi Curini and colleagues on the effect of valence shocks on party competition. His insights were the joining link that I was waiting for. I thus came to the assumption that the popularity cost could be described as a negative shock in the valence capital of a candidate, what I think represents the greatest contribution of my Ph.D.

Acknowledgements

There are several people I must thank. First of all, my supervisor Francesco Zucchini, that provided

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I must thank several people that helped me during my permanence at the Institute for Social Research at the University of Michigan, Ann Arbor. Among all, Robert Franzese assisted and provided me with extremely important suggestions, either about the formal model and the empirical strategy. Moreover, he was kind enough to accept the role of external reviewer of the present thesis. The help provided by James Morrow was fundamental for the development of my formal model; I also owe my apologies for having bothered him countless times at his ISR office. Arthur Lupia was one the persons that made my permanence to Ann Arbor possible, and found the time and patience to review the earliest (and worst) versions of my formal theory. My thanks also go to Dave Howell, who was of great help from a burocratic point of view, and for our nice talks at the Espresso Royale down the road.

At Bocconi University, the help provided by professor Massimo Morelli was fundamental for the final development of my formal model. He was also kind enough to accept being an external reviewer of my thesis. Thanks to his advices I was able to improve and simplify the model at the same time, without reducing its explanatory power. Professor Lanny Martin was extremely kind and available, and helped me correcting some important flaws of the earlier versions of the empirical testing of my valence assumptions.

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Several people from outisde of the academic world deserve my thanks. First, my family: my parents for the support, and my brother Luca for the indespensable pauses and distractions in the busiest times. My uncle Enio raised important points on the economic effects of electoral uncertainty that are likely to represent the object of my future studies. I am excluding several old friends from this list, that I cannot thank one by one, and not without a sense of guilt.

Last but not least, my most special thanks go to Laura, whose care and attention saved me in the most discouraging moments of my research.

Chapter 1

The State of the Art of the Research on Election Timing

Elections are probably the most important events in the life of competitive regimes: their outcome will determine what political forces will hold office positions. In most of parliamentary democracies, governing parties can time the termination of cabinets in order to maximize gains such as popularity, time in office, and policy influence. The timing of cabinet terminations in parliamentary systems is thus fundamental in order to understand how parliamentary democracies work.

Cabinets can terminate because of the opportunistic, utilitarian action of a governing party forecasting future policy failures, or, in case of minimum winning coalitions or minority governments, following the failure of policy negotiations between the politically relevant actors. In multiparty systems, typically characterized by a relatively high number of parties represented in parliament and coalition governments, there are roughly three ways in which a cabinet can terminate. First, a government coalition can be substituted without having an anticipated election: a new coalition of parties is found within the existing parliament, and substituting the previous one; second, the current governing coalition is interrupted by the call of an early election; third, the government terminates because the legislature reached its constitutionally mandated lenght. In any of these cases, the termination of the governing coalition has extremely important political

consequeces: the equilibrium between the political forces can change dramatically, producing profound policy effects.

A cabinet termination event is not just an important political event per se; the mere possibility of having an anticipated termination influences the distribution of the bargaining weights between governing and opposition parties, and consequently the outcome of the negotiations over public policies, and the future of whole political careers. This thesis is an attempt to improve our knowledge of these phenomena.

Preliminary Definitions

An important question must be posed at the very beginning of this inquiry: what should be considered as a cabinet termination? From 1942 to 1972, Australia has been governed by the same governing coalition of Liberal and Country parties; the party composition of the cabinet never changed, although four different prime ministers succeded one another.[1] An other, probably more controverse example is represented by the first three Moro cabinets in postwar Italy: between 1964 and 1968 three cabinets did succeed, all of them led by Aldo Moro from the Christian Democratic party, all sustained by the same parliamentary majority.[2] It was a succession of cabinets without anticipated elections, nor a change in the prime minister or a different majority. To what extent the cabinet changed in these cases? Should they be treated differently? In what cases should we consider a cabinet as terminated?

1 This example is taken from Lijphart [1984].

2 The coalition was composed of: the Christian Democracy (DC), the Italian Socialist Party (PSI), the Italian Democratic Socialist Party (PSDI), and the Italian Republican Party (PRI).

Several definitions have been provided in the literature; Lijphart [1984] provides a detailed review. The one I will employ in this context is analogous to the one adopted by Browne et al. [1984a, 1984b; 1986], that has become the standard definition in the literature. I assume a cabinet terminates when one of the following three events happens. First, a general election happens, followed by the start of a new legislature. Since every moment governing parties compare the current legislature with an hypothetical legislature that would happen in case elections were held, it is a reasonable assumption to hypothesize that being at the government right after the election is preferable, all things equal, to being in charge at the last month of the legislature. Second, the prime minister changes. The weight of a prime minister's preferences is such that the election of a new leader entails a completaly different cabinet, often composed of a completely different staff. Third, the party composition of the cabinet changes. The substitution of the current coalition with another can happen for several reasons: strategic withdrawal of a party, expulsion of a member, resignation of the whole cabinet.

Similar definitions have been used by Strøm [1985], King et al. [1990], Alt and King [1994], Warwick [1994]. This excludes the definitions proposed in other works [Blondel 1968; Taylor and Herman 1971; de Swaan 1973; Warwick 1979], in which a cabinet termination is assumed to happen whenever there is a change in the parties that provide external support too.

I will now review the main contribution to the scientific literature on election timing, making a preliminary distinction between empirical and theoretical works. The importance of this distinction is due to the difference between the concepts of duration and durability of cabinets. Political scientists are interested in studying to what extent a cabinet is more or less *durable* than others, though only its actual *duration* can be observed and measured. This difference is of critical importance; as Laver put: "The healthiest person in the world can be hit by a bus tomorrow, while someone who is a total physical wreck can limp on to a ripe old age" [2003:24]. Formal models provide theoretical accounts of cabinets' durability, while empirical models can only capture their

effective durations.

Empirical Works

In the empirical litrature, the findings of King et al. [1990] marked an important divide. They have been the firsts in applying vent history techniques to the study of cabinet termination. Their methodological advancements outperformed the preceding statistical models, based on OLS methodology.[3] Duration models take into account the fact that the termination of a cabinet is essentially a stochastic process, and at the same time a function of a series of explanatory variables that researchers individuate. They are more consistent with the theoretical problem of cabinet termination, and allow for better treatments of left- and right-censored observations and the effects of time-varying covariates. Moreover, though the same results can be achieved through mathematically simpler logit models, survival analysis allows a considerable computational efficiency [Box-Steffensmeier and Zorn 2001; Box-Steffensmeier and Jones 2004]. Survival models represent nowadays the standard tool for studying cabinet termination [see: Warwick and Easton

3 Before the application of survival models, the researches on cabinet termination have been divided in two competing empirical approaches. On one side, the advocates of the "attributes" approach, that aimed at the individuation of variables that could explain variations in the duration of cabinets [Dodd 1976; Warwick 1979; Strøm 1985]. The duration of a cabinet is thus thought as a function of these covariates. On the other side, the "events" approach, founded by Browne et al. [1984a, 1984b], was stochastic in nature: it assumes a world of random events, described through Poisson models – that can potentially tear down the cabinet, and that cannot be controlled by political actors [Cioffi-Revilla 1984; Browne et al. 1986]. For a more detailed review of this now dated debate, see Strøm et al. [1988] and Laver [2003].

1992; Warwick 1992, 1994; Alt and King 1994; Diermeier and Stevenson 1999, 2000; Diermeier and Merlo 2000].

After the introduction of this family of models in the literature, a methodological diatribe started about the shape of the hazards of cabinet termination. In King et al. [1990] the hazard rate of the event "cabinet termination" was assumed as constant throughout the legislature – a conclusion later confirmed by Alt and King [1994]. Their findings were at odds with the works of Warwick and Easton [1992] and Warwick [1994], who estimated steepening hazards, raising as the time of the legislature passes. The solution of this debate was largely provided by Dermeier and Stevenson [1999]: they reconciled the two different positions employing a competing risks model, which allowed them to distinguish between two events: replacements, or the substitution of the current governing coalition with a new one, without going to the polls; and dissolutions of the parliament and call of anticipated elections. Their major finding was that the replacements hazard was flat, while the dissolutions hazard was increasing through time.

Notwithstanting the significant methodological improvements of the last decades, the empirical literature is still in need of a bold connection with a solid theory that could generate testable hypothesis [Laver 2003:30]. The next section reviews the theoretical models that have been developed in parallel with empirical works.

Theoretical Works

In order to depict the current state of the theoretical literature I will first start, following Lijphart [1999], by making an important distinction between *Westminster* and *multiparty*, or *consensual*

models.

As will become clear, Westminster models reached a higher level of mathematical formalization, making these theories more refined than their multiparty counterparts. This is due to at least two main differences between these parliamentary models of polity. First, since Westminster models assume a single party or decision maker at the government, political scientists do not need to model negotiations over public policies that happen among coalition partners in consensual systems; the presence of less theoretical constraints allows to improve the decision making formalization to a significant extent. Second, they only need to account for one type of cabinet termination: anticipated elections. The possibility of a replacement of the current coalition with a new one from the same parliament, without recurring to an early election, ddoesn't need to be modeles. Although it is always possible to have a cabinet termination due to a prime minister's death or resignation, all the Westminster models developed up to now are not meant to describe it.

Balke [1900] published the first important contribution in the field of formal models of election timing. The object of interest of his paper is modeling the choice of a rational prime minister that weights costs and benefits of interrupting the current legislature in order to win office positions for another full term.

Calling a snap election is defined as an optimal stopping problem, that solves:

$$V(t, p_t) = \max_{\tau} \; E_t\{\int_t^{\omega} e^{-r(s-t)} u(s, p_s) ds \; + \; e^{-r(\omega - t)} V(\omega, p_\omega)\}$$

where $V(t, p_t)$ is the value of holding office at time t, given a popularity level of p_t ; τ is the stopping time that maximizes the expected utility given a current popularity p_t ; t is the amount of time in office since the last election. The first term represents the value of office holding until the

next election; r is the rate of the exponential discount factor, and u(s, p_s) is the instantaneous utility of being at the government given time s and popularity level p_s. The following term V(m, p) represents the value calling an election. Intuitively, the legislature ends when the value of calling a snap election exceeds the value of keeping the cabinet alive. W is the time an election ends. This can be cused by three possible events: the government reached the constitutionally mandated termination of the legislature (time T); the government voluntarilty calls an early election (time t); the government is forced to call an early election (time η). Given these insights, $\omega = \min(T, t, \eta)$.

In Balke's model, the government's popularity follows a stochastic process, and cannot be systematically manipulated by the incumbent. Its form is defined as follows:

$$dp = \alpha(t,p)dt + \sigma(t,p)dz$$

where $\alpha(t,p)dt$ is the deterministic component of the government's popularity, while $\sigma(t,p)dz$ is the random component, representing its volatility. dp is simplified so that it is in the interval [0, 1], with 0 and 1 representing the bottom and the peak of popularity. Balke describes the possibility of the government being subject to a vote of no confidence by assuming that when popularity reaches 0, i.e. the lower bound of popularity, the incumbent is forced to call an election. Terminating the legislature at time w has a value $V(\omega, p_\omega)$ for the government, that is given by:

$$V(\omega, p_\omega) = G(p_\omega)V(0, p_\omega) - (1-G(p_\omega))V(0, 1-p_\omega)$$

where $G(p_\omega)$ is the probability of the government winning the election given popularity pw; $V(0, p_\omega)$ is the value of winning the election; $V(0, 1-p_\omega)$ is the value that the opposition party receives if it wins the election.

At this point, Balke defined an arbitrary threshold B(t) as the critical level of popularity at which the value of holding office equals the expected value the government receives from facing an election. The government's optimal choice of an election date, tau, is the first time pt >= B(t). Determining the optimal time to call an election amounts to solving for the stopping boundary B(t). Using some standard tools from the literature on stochastic methods [Friedman, 1976 and Malliaris and Brock, 1982], the optimal stopping problem posed by equation ( ) was solved, allowing for a set of results that can be summarized as follows. First, governments tend to call an election when their popularity is high and the constitutionally mandated election day approaches; they are also more likely to call an election when their popularity drift is negative, in order to minimize popularity losses. Second, elections are more likely to be called when the government's popularity is volatile; this is due to the fact that a volatile popularity doesn't last for long time, making the government more willing to seize the opportunity. Third, the government party is more likely to call a snap election if its time discount factors are low, making the benefits of a new legislature less attractive. Fourth, a government is more likely to call a snap election when the probabily of being defeated by a vote of no confidence is high.

Balke's optimal stopping model provided the most refined mathematical description of the exit option of the governing party, i.e. its expected value of exiting the existing legislature and going to early elections. The exit option was described as a Brownian motion – more precisely as a Wiener process, characterized by increasing variance, which is suitable for describing an incumbent's future uncertainty.

His conclusions can be summarized as follows. First, governments tend to call an election when their popularity is high and the constitutionally mandated election day approaches; they are also more likely to call an election when their popularity drift is negative, in order to minimize popularity losses. Second, elections are more likely to be called when the government's popularity is volatile; this is due to the fact that a volatile popularity doesn't last for long time, making the

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Although Balke's model reached noteworthy levels of formalization, It must be noted that this level of mathematical refinement is a double-edged sword: Brownian motion pushes the model at very high levels of formalization, hardly comprehensible for those who lack a basic understanding of differential equations and optimization problems. More problematic is the way he described the occurrence of termination events: he recurred to arbitrary popularity thresholds in order to explain the termination events, either a volutary snap election or the occurrence of a no confidence vote. This last case is particularly problematic: no strategic interaction among party actions is modeled. The decision making process that might lead a party faction to tear down the cabinet is not described; Balke just limits himself to assuming a popularity threshold (p, = 0), that when reached causes a systematic termination of the legislature, without any further explanation.

Among this family of theories, the works of Smith [1996, 2003, 2004] represent probably the most advanced body of research in the field. He provided the best integration of formal modeling and empirical testing, though restricted to British governments alone. His signaling theory models how the electorate reacts at the timing decisions of prime ministers in Westminster systems [1996]. Smith's contributions are based on the following assumption: the better the future prospects for the government, the lower will be the incentive for calling anticipated elections. If a prime minister will keep being popular in the future, there will be no incentives for calling a snap election; in order to maximize her time in office, she will just wait until the end of the legislature, and win the following elections. Her incentives of calling an early election will be low even in case the incumbent party is more popular than the opposition. Only a prime minister that forecasts future policy failures has an interest in going to the polls anticipately; for these reasons voters should be

skeptical about the reason when a snap election is called. Since competent governments wait longer before calling early elections, their timing represents a signal for the electorate about the government's future performances. Once an election is called earlier than expected, a Bayesian electorate updates its beliefs about the incumbent's capacities of running the economy and the country. Calling a snap election always determines a popularity loss for the incumbent. A rational prime minister that anticipates a deterioration of the economy thus needs to choose between calling an early election and paying the popularity cost, or waiting for the decline to happen.

Smith's theory allowed also for the analysis of the electoral cost the governing party faces calling early elections; he was the first in finding empirical evidence of the fact that some voters punish prime ministers for their opportunistic election timing [2003, 2004]. As it will be shown below, this finding is extremely important for the purposes of the present thesis.

Another important model is the one proposed by Kayser [2005], that linked opportunistic cabinet termination with the literature on political-economic cycles. In his model, election timing is a problem of optimization under uncertainty, to be analyzed using dynamic programming tools.[4] More specifically, election timing is described as an optimal stopping problem, based on few assumptions: voters have no memory of previous periods; the government's reelection probability, p, in each period $t \in \{1, 2, 3, \ldots, \tau\}$, is strictly increasing in a random state variable

$$\mu \sim \text{Uniform}\left[1-\frac{1}{2\zeta}\ ,\ 1+\frac{1}{2\zeta}\right]$$

4 Dynamic programming is a method that is meant to solve optimization problems involving a sequence of decisions based on the Bellman principle of optimality [Bellman 1957]. It determines, for each decision, subproblems that can be solved following a similar, recursive pattern, such that an optimal solution of the original problem can be found from optimal solutions of subproblems [Lew and Mauch 2007].

where ζ represents the density. It is the case of a discrete-time Markov process, where each draw of μ_t is independent of others. Governments choose the optimal timing of elections waiting until the highest μ_t that they believe will occur during the legislature. Office utility is constant over time.

In the set of $\{1, \ldots, \tau\text{-}1\}$ periods of the game, i.e.: all except the last one, the government's expected value for the subsequent period $E_t(\mu_{t+1})$ equals the expected value of the random variable μ, i.e., one. The expected state continuing from t to t +1 is the value of playing an optimal strategy at t, i.e., the average expected state from t's two possible outcomes over all possible values of μ:

$$U(t) = \max_t \begin{cases} \text{continue} & \text{,if } \mu_t < E_t(\mu_{t+1}) \\ \text{call} & \text{,if } \mu_t > E_t(\mu_{t+1}) \end{cases}$$

Each period in office the government gains a payoff, defined as an ego rent R.

The rational office-seeking incumbent continues in office until the expected utility of calling an election exceeds the expected utility of continuing in office. The respective continuation value λ is represented as:

$$\lambda = e^{-\delta(\tau-t)} p(E(\mu_{t+1}))\tau R + (\tau - t)R$$

where the first term represents the expected value of calling an early election, i.e.: the product of the reelection probability generated by the expected future state $p(E(\mu_{t+1}))$ and the utility of a new term in office, τR, appropriately time discounted. The second term in the equation, $(\tau - t)R$, captures the remaining utility in the current term in office and shrinks as the term progresses, providing a diminishing incentive to forgo favorable election opportunities. τ is the maximum term length in periods and t represents the current period.

The prime minister compares the continuation value just exposed with the expected utility of calling

a snap election, described as

$$n_t = p(\mu_t)\tau R$$

which represents the maximum length of a new, full term, weighted by the current reelection probability $p(\mu_t)$.

In the remaining part of the paper, Kayser shows how constructing *p* as a linear combination in which past reelection standing is combined with new events in proportion to the strength of voter memory does not change the model's fundamentals. A higher voter memory reduces the volatility of government reelection probabilities and consequently lowers the likelihood of early elections. Voters' decision making process are modeled more explicitly, with respect to economic welfare. Their choices depend from a government provision of public goods, described by a function $g_t = z_t(Ty + s_t)$, including the tax rate T, income y, aggregate two-period economic shocs, and a hidden tax st that shifts resources from future to the present, improving current period welfare at the cost of the equivalent amount plus negative economic distortions, V(s), in the subsequent period [:21].

Manipulating the economy right before a general election will cause a postelection economic downturn captured by lower government revenue, lower public goods provision, and negative distortionary effects. The goal of a self interested government is thus finding a trade off between voter welfare and reelection probability.

Comparative statics then suggest: first, that opportunistic election timing represents a substitute for economic manipulation; second, that in countries with more volatile economies governments are more prone to calling eraly election opportunistically and less inclined to economic manipulation; third, that longer legislatures make snap elections and economic manipulation more likely; fourth, that higher office utility decreases the likelihood of election timing, but increases economic

manipulation [:19].

Kayser's model is mathematically very efficient: he could greatly simplify it recurring to dynamic programming techinques in the description of the governing party's utility, that allowed for the solution of a complex problem by breaking it into simpler subproblems; the model could be reduced to an optimal choice function describing the passage from a stage to another of the game. Although sacrificing the continuous nature of time doesn't represent a great theoretical cost, its description of the exit option as a purely stochastic process is not fully convincing: it is significantly more simple than a Brownian motion but it lacks in realism. Parties keep producing forecasts about the future developments of their popularity and the economy, and a purely stochastic process is not able to capture these dynamics. However, Kayser's model has two important merits: he introduced dynamic programming tools in the literature on cabinet termination, and he was able, as Smith did, to connect this literature to the topics of political-economic cycles.[5]

As I noted above, describing the government as a unitary actor allowed Westminster models to reach considerable levels of mathematical formalization. The relative simplicity of single actor models allowed for significant theoretical refinements of the decision making process, and more satisfying accounts of the effect of time on the actors' choices. Multiparty systems are harder to describe. The reason behind this difficulty is the higher complexity of multiparty competition: since consensual systems are often governed by coalition of parties, it is necessay to describe not just the choice of incumbents to keep the government alive or not, but also the negotiations over public policies among them, and their effects on the likelihood of cabinet termination. The bargaining game between coalition parties is thus a complex and variegated phenomenon, that is crucial in order to understand cabinet termination in consensual democracies.

5 A related research published by Kayser [2006] treated the effects of export expansions and internationally transmitted economic cycles on the timing of elections.

The firsts who tried to formalize this process have been Lupia and Strøm [1995], in probably the most relevant game-theoretic work produced on cabinet termination in consensual systems. Their model represents the theoretical starting point for the study of this form of polities.

Lupia and Strøm developed a model to explain the causes of cabinet termination in a parliamentary polity characterized by coalition governments and a parliament provided with dissolution powers. It consists of a three-party game: two coalition partners and an opposition party. All the players share a common knowledge.

The game is assumed to begin at some point during a legislature, after a potentially critical popularity shock, signaled by a reliable poll, is happened. This game allows for three possible outcomes: a continuation of the existing coalition, its substitution with a new one, or a premature dissolution of the legislature and the call of new election.

The players' utilities are composed of several parameters, that are determined exogenous to (prior to) the play of this game: si represents the subjective value to party i of the seats that it controls, described as as equivalent to i's parliamentary seat shares; ci represent party i's share of power in the governing coalition, i.e. the size of the pie slice that party i receives [:652]; g_j^i is the value to party i of being in a coalition with party j. A combination of these given parameters represents the utility, for a governing party, of being at current government: $s_i + (c_i \times g_J)$.

This value is compared with b^i, i.e. the expected utility of a period 1 election to party i. This parameter represents all of the game-relevant information about party i's postelection well-being.

Calling a snap election comes with opportunity costs, defined as the policy-making and rent collection opportunities that a party looses; and transaction costs, defined as election-related intraparty negotiation, campaigning and electioneering. A party's opportunity costs are defined as equal to the current governing utility $s_i + (c_i \times g_j^i)$, while E_i represents the election-related transaction costs. Party i expects thus a period 2 utility equal to $b_i - E_j$, from a period 1 election.

Once the game starts, i.e. the popularity shock is realized, each incumbent party can offer a reallocation of power to another party, either the current coalition partner ot the opposition party. If the party to whom the offer is made accepts the offer the game ends, and period 2 payoffs are determined according to the new distribution. In case the offer is rejected, the second party can make an offer that could lead to an alternative allocation of benefits. In case none of the offers are accepted, then a no confidence motion is called. In other words, a no confidence vote happens either when no offer is accepted, or a parliamentary majority wants such a vote. Once the vote is held, the majority of MPs are assumed to vote 'no' and the parliament is dissolved, leading to an early election. If the vote is held, and parties controlling a majority of seats vote no, then parliament is dissolved, new elections are held, and the game ends.

Starting a negotiation on public policies involves a transactions cost K_i, which is meant to capture the effort required to reach an agreement with party members and constituents.

A singular feature of this model is the assumption of parties' *a priori* preference for political stability. The option of calling a snap election is never available as an incumbent's first choice. Instead, it is always described as a consequence of a negotiation failure.

The model's results have been showed as follows. They established a set of conditions:

> Condition A. There is a majority that prefers an election to leaving the governing coalition exactly as it was.
>
> Condition B. All offering parties prefer an election to the best acceptable offer they can make.
>
> Condition C. No offering party prefers the best acceptable offer it can make to leaving the governing coalition exactly as it was.

That lead to the three following theorems:

Theorem 1. The event leads to a dissolution if and only if A and B are true.

Theorem 2. The status quo is maintained if and only if A is false and C is true.

Theorem 3. The event leads to a nonelectoral redistribution of power if and only if either (1) A is true and B is false or (2) A and C are false [:655-6].

The conclusion is that exogenous events, such as a popularity shock, can affect incumbent parties' negotiation on public policies. The importance of the study of critical events is strongly underlined. In legislatures vested with dismissal and dissolution powers, expected electoral impact is often what makes a political event "critical" to cabinet stability [:659].

One of the merits of the Lupia and Strøm's model is that they have been the first who modelized multiparty systems, describing the possibility of a termination of the cabinet that is alternative to anticipated elections. Moreover, Lupia and Strøm have been the firsts who provided a theoretical account of the effect of electoral expectations on the outcome of the negotiation over public policies, and consequently on the probability of cabinet termination. Lupia Strøm found out that the anticipation of future electoral gains by the governing parties is just one of several causes of termination. Because of the complexity of the political competition in consensual systems, it is not possible to limit explanations of cabinet terminations to the forecast of future policy failures [Smith 2003, 2004], or of future electoral gains [Grofman and van Rozendaal 1994]. Lupia and Strøm have shown that coalition governments can terminate because of a policy negotiation failure, and that the probability that an opinion poll shock determines a cabinet termination grows as the constitutionally mandated termination of the legislature is closes.

Multiparty models did not significantly improve since Lupia and Strøm. The latest studies on election timing in multiparty systems from Strøm et al. [2008] simply makes reference to their model. Later contibutions in formal modeling focused on the recurrence to the vote of confidence

procedures [Huber 1996], and how different institutional settings affect the bargaining process among coalition parties [Huber and McCarty 2001; Strøm and Swindle 2002]. The main limit of this class of models is that they are all a-temporal: they assume a shock happened at some point in the legislature, and that actors choose consequently; time is not modeled as in their majoritarian counterparts [Balke 1990; Kayser 2005].

In a series of papers, Diermeier and colleagues [Diermeier and Feddersen 1998; Diermeier and Stevenson 2000; Diermeier and Merlo 2000] tried to solve this problem. Diermeier and Feddersen modeled time in a legislature, but the goal of their model was to explain differences between political systems with vote of confidence procedures, and systems devoid of it. They explained how a cabinet could lose its confidence in the parliament, but they didn't try to describe the case of a governing party causing a voluntary termination of the cabinet. The model of Diermeier and Stevenson was just the stochastic version of the Lupia-Strøm model. Diermeier and Merlo solved the "time problem" only partially, developing a model in two stages, which the first represents the process of cabinet formation, that will not be treated in this study, and the second represents the whole legislature, reduced to a vote of confidence over a policy agreement.[6] They achieved interesting conclusions about coalition theory, explaining the emergence of different kinds of governing coalitions (minority, minimal winning, oversized) but at the cost of oversimplifying the policymaking process.

The multiparty models exposed up to now are thus in a paradoxical state: they are theories of election timing in which time is (almost) non existent. These models fail to provide a formal description of the effects of time over the governing parties' choices, neglecting the obvious assumption that for a governing party giving up the last years of legislature is not like giving up the last months. The empirical findings of Diemeier and Stevenson [1999] on the shape of the hazards of cabinet dissolutions tell us that political scientists should not be satisfied with the state of the art

6 The same pattern was followed by Baron [1998], based on a preliminary version of their model [Diermeier and Feddersen 1996].

of consensual models. Up to this point, the literature forces the reader to make a choice: a model with a single, unitary actor that can effectively describe the effect of time on the likelihood of cabinet termination, or a consensual model able to describe the bargaining interaction that is going on in most of European parliamentary democracies, but devoid of an adequate description of the effects of time.

In addition, consensual models present four additional, common problems. First, they are not spatial models. Even those presented as spatial models [Diermeier and Merlo 2000] actually work as divide-the-dollar games; a good integration of theories of cabinet termination with spatial models of policymaking is fundamental for an advancement in both fields, since the two are strictly connected. A second, striking feature is the excessive simplicity of the policy negotiations among coalition partners: in all the models exposed, bargaining among players is represented as a finite, short sequence of offers and counteroffers; this keeps these models as simple as unrealistic. Finite-horizon models suffer of two main limitations: their solution and the final payoffs for each player depend from the lenght of the game; and they assume that once the last stage of the game is reached parties are no more allowed to counter a policy offer, but only to accept or reject it [Fudenberg and Tirole 1991]. Third, an important aspect of election timing that current theories avoided almost completely is the electoral cost, to be expressed in terms of votes, that a party faces after causing anticipated elections. Smith represents an exception to this lack of attention, but he only checked the existence of this effect in an empirical model. A theory of how this cost happens, and what factors determine its magnitude, is completely lacking in political science. Moreover, the available empirical evidence is contradictory: Blais et al. [2004] found no significant effect of this cost in their analysis of the 2000 Canadian election. The lack of treatment of this electoral cost is striking, since I assume it being the main deterrent for a party from triggering early elections. Finally, with reference to the previous paragraph, existing theoretical models have not been subjected to systematic empirical testing [Laver 2003:38]; without a stronger link between theory and empirical

research, none of them will be able to significantly improve.

The sole, partial exception to the general lack of empirical treatment is represented by the work of Diermeier and Stevenson [2000], that succesfully tested the raising hazards assumption of the Lupia-Strøm model using competing risks survival analysis. It must be noted though, that Diermeier and Stevenson tested only that aspect of the Lupia-Strøm model. The "reliable poll" assumption, i.e. the hypothesis that the likelihood of cabinet termination can be explained through variations in parties' electoral expectations, has never been subject to empirical testing. In fact, Diermeier and Stevenson's research, as all the ones exposed above, limit themselves to "static" tests: for each cabinet, they record its time lenght while controlling for several covariates capturing institutional and political effects, and then apply event history methodology. The role of electoral expectations, by definition mutable and constantly changing, cannot be captured with these overly simplistic methods.

I will now expose the structure of the present dissertation, and point out what improvements it will bring to this branch of the political science literature.

Structure of the Dissertation

I will start chapter 2 raising a preliminary question that will be fundamental for the development of my thesis, that can be summarized by the following question: do voters punish prime ministers for the calling anticipated elections? It is well known that in parliamentary systems, governing leaders time elections in order to maximize future benefits, but how voters reacts to this opportunistic move is still an open question. As I will show, the scarce evidence available reached contradictory

conclusions [Smith 2003, 2004; Blais et al. 2004]. My research will provide a solution to the existing debate, showing that all the findings provided up to now represent specific cases of a more general phenomenon. For the first time in the literature, I will link the research on cabinet termination with the research on valence issues in party competition. I will individuate what factors are more likely to influence the magnitude of the popularity cost of calling an early election, while controlling for several covariates.

The core of my thesis is represented by the game-theoretic model that will be depicted in chapter 3. On the basis of the Lupia and Strøm's model, I will develop a three players game, representing two coalition parties and an opposition party, that play through a legislature defined as a series of discrete steps. In each stage of the game, each governing player observes her electoral expectations, and chooses between starting a negotiation on public policies with other cabinet parties, negotiating with the opposition party on the creation of a new cabinet, and causing anticipated elections. With respect to preexisting literature, my game will show a series of improvements.

First, the game is no more of a static type: I will be able to introduce time in the model and account for its effects on the outcome of players' negotiations. To keep the model as simple as possible, I followed the example of Kayser [2005] and characterized it as a sequence of descrete steps. Second, it introduces spatial considerations, such as the ideological location of the players and their coalition opportunities. It constitutes a first attempt to link the literature on election timing with the literature on spatial theory of party competition and policymaking. Third, I developed a theoretical explanation of the popularity cost of calling a snap election, linking for the first time the literature on election timing with valence models of party competition.

Later in the chapter, I will report empirical testing of the fundamental assumptions of my model. Some of them, while already popular in the literature, have received little-to-no empirical testing. I will thus propose the following two contributions. First, since blackmailing among

coalition partners is based on the credible threat represented by the exit option, I will explain the likelihood of cabinet termination using voting intention trends, providing evidence in favor of the assumption that cabinet termination can be understood by looking at the electoral expectations shared by parties, as measured by opinion polls. Second, by using measures based on voting intention trends from four European consensual democracies, covering more than fifty years of parliamentary politics, I will run parametric and semiparametric survival regressions with time-varying covariates. Results will show that variations in the exit option for the governing parties efficiently explain the likelihood of cabinet termination. On consensual democracies, this kind of test has never been conducted before.

Chapter 4 will treat a corollary research. If it is possible to employ voting intention trends in order to explain the likelihood of cabinet termination, in the same way it must be possible, I argue, to use the same data to understand ministerial duration. In fact, the firing, the substraction or increase in a minister's policy prerogatives can be described, under the lenses of the bargaining theory exposed in Chapter 3, as an exchange currency in the power game among coalition parties. Using the same survival analysis techinques, I will show how imbalances in incumbent parties' popularity is associated with more frequent redistributions of power withing the governing coalition. Even in this case, my empirial models will include time-varying covariates, unlike previous researches, producing an empirical contribution to the literature of ministerial duration.

A final chapter will conclude the dissertation.

Chapter 2

The Popularity Cost of Manipulative Election Timing.

A Valence Theory.

In most parliamentary systems, elections dates are not fixed[7]. Since government leaders are not directly elected by voters, but nominated by the parliament, the survival of the cabinet depends on it. During the course of a legislature, the parties that control the cabinet can choose, thus, to withdraw their support causing its termination and opening a government crisis, an event that often leads to the call of anticipated elections. This can be done in several ways. In some systems, such as the United Kingdom, where the head of the State is not partisan and the prime minister has unilateral dissolution powers, incumbent party leaders enjoy great freedom in choosing the date of elections. In other systems, such as Austria, charachterized by a more complex political competition, weaker prime ministers, and strong dissolution powers in the hands of a partisan head of the State, a party at the government (or one that provides external support, as in the case of minority governments) can influence the timing of elections. The leader of a party in control of some ministerial positions can choose, for example, to withdraw its ministers anytime, forcing the country to go through a government crisis. If alternative governing coalitions are not available, or

7 This specification has to be made in order to exclude those countries, such as Norway and post 1975 Sweden, in which the dates of elections are fixed in time. In these countries, general elections must be held at fixed time intervals that are determined by the constitusion itself, independently from potential government crises.

they do not represent a viable choice, that crisis is likely to lead to early elections. In more radical cases, the party can align against the government when a confidence motion is attached to a bill voted in the parliament, or even to propose a no confidence motion and tear down the cabinet.

It can be inferred that in the vast majority of parliamentary systems, a government party has the possibility of determining, or at least influencing, the timing of elections. A prime minister who is forecasting a future economic crisis might be led to call a snap election in order to increase the chances of reelection [Smith 2003, 2004]. Unpopular incumbents might choose to do it in order to minimize popularity loss, while favored ones might take advantage of temporary peaks of popularity. The peculiar features of parliamentary polities outlined here provide incumbent party leaders and prime ministers with a significant advantage. The timing of elections can be choosen or influenced in order to maximize expected future benefits, such as a higher popularity, a longer stay in office, or a greater influence on policymaking.

However, these powers come with a cost for governing parties: the strategic timing of an election represents a manipulative act that might disappoint at least a fraction of the electorate. In voters' eyes, calling a snap election in order to maximize expected future gains does not correspond to how elected officials should behave in order to represent interests of the nation. Government leaders calling an early election are accused of giving precedence to their own personal gains, rather than representing their constituency or running the country responsibly. Once at the polls, disappointed supporters of a government party might choose to punish the incuments for their opportunistic choices. How many votes a governing party lose after a snap election has been called? This question represents the central theme of the present paper. Surprisingly, there is a lack of relevant studies on the topic. Notwithstanding these difficulties, it is impossible to fully understand how the timing of elections in parliamentary systems works without an adequate description of this cost.

The structure of this chapter proceeds as follows. First, I will briefly review the available

literature produced on the topic, a report on the contrasting conclusions reached by different scholars. Second, I will provide a theretical explanation of the popularity cost of calling a snap election, linking, for the first time in political science, the literature on cabinet termination with that on valence issues in spatial models of party competition. Third, I will test a set of hypotheses that can be deduced from this theoretical model using the first comparative dataset, providing empirical support for them. Fourth, on the basis of evidence presented, I will explain why past researches reached different conclusions about the manitude of this cost. A commentary will conclude the paper.

Contradictory Evidence from Previous Works

There are a few, noteworthy exceptions to the general lack of interest towards this topic. The first is a collection of works on election timing produced by Smith [1996, 2003, 2004], whose main goal was to explain the likelihood of cabinet termination in the United Kingdom.[8] Smith proposed an informational theory that was able to link election timing, economic performance and electoral outcomes. The game theoretic model he developed [Smith 1996] is based on an informational asymmetry between government leaders and voters. If government leaders can forecast future, potential economic declines better than others, it follows that snap elections have to be called by British prime ministers in anticipation of an economic downturn. The greater the expected decline, the greater the probability that the prime minister will call an early election.

8 Although the insights it provided have been tested on British governments only [Smith 2003, 2004], his results might be extended to the totality of majoritarian parliamentary system. The definition of majoritarian and consensual systems is based on Lijphart [1999].

Anticipating the elections, however, comes with a cost. This opportunistic action reveals the prime minister's negative expectations about the future to the electorate. The timing of an election informs voters about what conditions they should expect in the near future, leading them to adjust their appraisal for the government. As it was provocatively concluded by Smith: all else being equal, early elections are fought between incompetent incumbents and ill-prepared challengers [2003:401]. All of his predictions have been tested in following works [2003, 2004], where he employed a set of linear OLS regressions in order to describe the two-party change in support for the government after an election was announced. Its results suggest that the opportunistic timing of an election affects the electorate's support of the incumbent party. Smith's empirical research [2003, 2004] represents the first works where the negative reaction of the electorate to opportunistic election timing was observed and estimated.

But the evidence on the existence of that popularity cost is not at all unanimous. Blais et al. [2004] challenged the admittedly controversial assumption that is central to Smith's theory, according to which voters are able to interpret the decision to call an anticipated election as a signal of the government's incompetence, and update their beliefs about the incumbent candidate. Their research consists of a deep and thorough analysis of how Canadian voters reacted to the decision of prime minister Chrétien, leader of the Liberal party of Canada, to call an early election in 2000.[9] The goal of their analysis was to check whether voters understood the manipulative nature of the prime minister's choice, denounced by both the media and the opposition, and would therefore punish him at the polls or not [:309-310]. From their analysis it results that Chrétien's decision to call a snap election produced a weak indignation effect. Very few, informed voters choose to punish Chrétien's Liberal party, which suffered a vote loss that was estimated around one percentage point. Their conclusions are thus opposite to the ones reached by Smith: only a few voters punish prime ministers for calling a snap election, though, as the authors themselves admitted, it is not clear whether the 2000 Canadian election represents an exceptional case or not [:317]. Again, the issue

9 Data have been taken from the 2000 Canadian Election Study (CES).

deserves further study.

What conclusions can be drawn from this review of the existing literature? Both studies are very different in their aims and methodology, and have been conducted on different countries and on different time intervals. The evidence provided by Blais et al. focuses on one election, with deep and thorough analysis allowing for limited generalization. At the same time, Smith provides a broader look of the topic, but limited to the United Kingdom alone. Moreover, the OLS regressions from which his conclusions about the existence of the popularity cost of calling a snap election have been taken have been run on extremely small datasets, including 13 to 14 observations [2003:414]. Available empirical evidence is thus relatively scarce and no comparative work has ever been produced before the study herein. Moreover, no research has ever tried to explain the discrepancy between the results reached by different scholars. The purpose of this study is to fill this gap.

In the next section, I will propose a simple formal model providing a theoretical explanation of the extent of the popularity cost of calling a snap election. In order to do that, it is necessary to link this problem to the literature on valence issues in party competition. The argument is that the conclusions provided by Smith [2003, 2004] and Blais et al. [2004] do not exclude each other, but rather represent specific cases of a more general and variegated phenomenon. From the combination of theoretical insights and empirical evidence, it will be possible to identify a set of factors that are likely to influence the magnitude of the popularity cost of calling an early election, and explain why in the 2000 Canadian case this cost was minimal.

A Valence Theory of the Popularity Cost

Let us assume a simple downsian model [Downs 1954], where two parties, whose proposed policies are labeled L and R, compete on a single-dimensional policy space on which a risk averse electorate is uniformly distributed. The assumption of proximity voting shapes the actors' preferences: each voter will choose the candidate who minimizes the distance from their preferred policy.[10] If, from this bare model, we try to describe the popularity shock that a prime minister or an incumbent party suffers after the calling a snap election, there would be dubious assumptions over the nature of voters' preferences. What makes a simple Downsian model incompatible with the description of the phenomenon of voters punishing an incumbent for calling a snap election is the assumption of proximity voting. In such a theoretical framework, in which electors cast their ballots based on the candidates' ideological distance from their ideal policies, why would they change voting preferences after a prime minister chooses to call a snap election? Perhaps the opportunistic decisions taken by government leaders produce alterations in the distribution of voters' ideal points? Did those who choose to punish the prime minister after taking an opportunistic action actually change their ideas about politics and society? These predictions seem hard to defend. In order to provide a satisfying theoretical account of the negative reaction of the electorate that follows the call of a snap election, simple Downsian models need to be enhanced. The present paper makes the argument that what makes some voters change their vote is a valence cost the prime minister pays after an opportunistic election call.

The term *valence issues* was introduced by Stokes [1963], in an important article in which he provided a sharp critique of the basic assumptions of Anthony Downs' spatial theory [1954]. According to Stokes, every candidate should be described by either *policy* or *positional issues*, and *valence issues*. On the former, candidates are divided and spread along one ore more ideological

10 In this simple proximity voting model an indifferent voter is assumed to either pick a candidate randomly or to abstain, as in Downs [1954].

axes; on valence issues instead, no spatial competition happens. All candidates and electors can be thought as grouped on the same ideal point, i.e.: they all share the same preferences. Voters have different views on the degree of the state's control of the economy, on civil rights and immigration, but there is an assumption that a highly educated candidate is preferable than a poorly educated one and that honest politicians are better than "rascals". As several works have shown [Ansolabehere and Snyder 2000; Groseclose 2001; Ashworth and Bueno de Mesquita 2009; Clark 2009; Serra 2010] the effect of valence issues plays a crucial role in order to explain political competition and a party's chances of winning.[11]

From the framework of a spatial voting model, how can valence issues explain the magnitude of the electoral cost of calling a snap election? The answer to this question constitutes the central theoretical argument of the present study: *calling an early election involves a valence cost for an incumbent party or prime minister*. Voters don't have high esteem for those showing clearly opportunistic intentions, and the fact that a party looses some votes after calling a snap election doesn't mean that its electorate has suddenly changed political views. Such a downturn in the citizens' trust towards selfish, opportunistic politicians can be expressed in a reduction in their valence capital. In a valence model, voters choose the their preferred party on the basis of two elements: their ideological distance from the different candidates, and their respective valence capital.

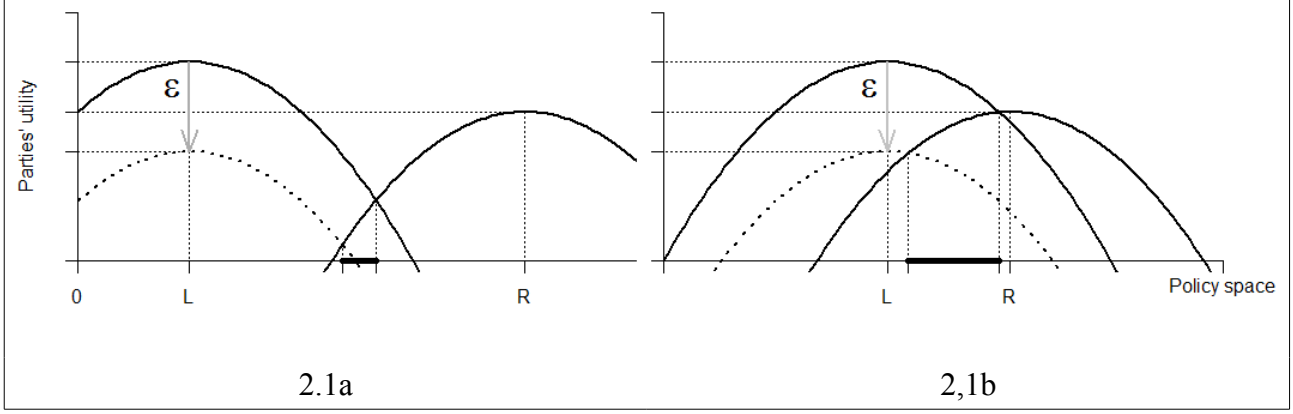
Given the assumptions formulated above, it is possible to define a utility function for each elector E in the following way:

11 It has to be said that, notwithstanding its relevance in the literature on party competition, this body of research didn't reach unanimous results. The formal models provided by Groseclose [2001] and Serra [2010], for example, lead to opposite predictions on the strategic location of parties provided with differing valence capitals. All of these studies, though, have showed the impressive improvements on the spatial theory of party competition that the incorporation of valence issues has provided, and how a difference in the valence capitals owned by competing candidates allows political scientists to explain why Downsian convergence is not observed in the empirical world.

$$u_E = -(x_E - x_P)^2 + v_P \,, \qquad (2.1)$$

where x_E represents an elector's ideal point, x_P is the public policy adopted by an elected candidate P, and v_P represents her respective valence capital.[12] The simple shape of this utility function allows us to describe, with very few elements, how voters choose their candidate weighing ideological proximity on one side, and virtues such as honesty and competence on the other.

Figure 2.1. Variations in the size of the Stokes region in a two-party legislature.



2.1a 2,1b

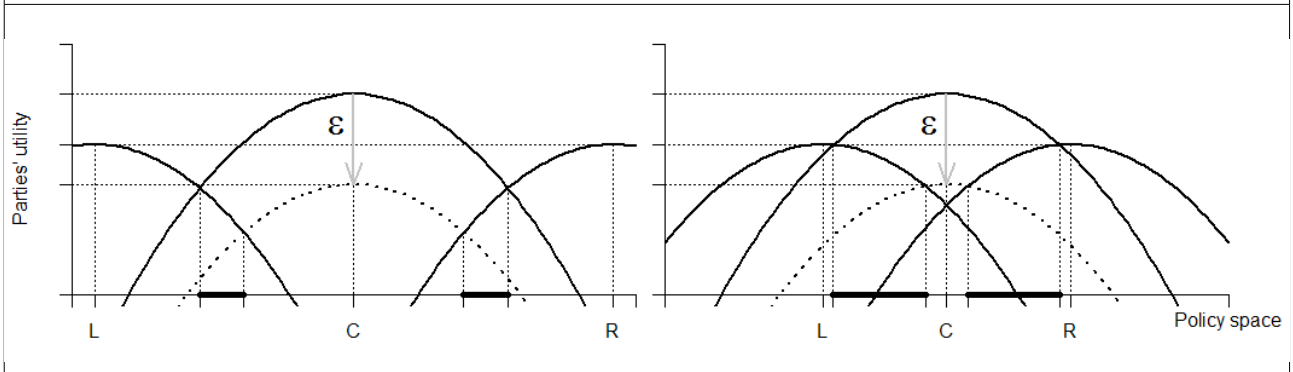
Figure 2.1 represents the case of a two party legislature in which a party A, running for office aginst a competitor B, suffers an ε valence shock, and how the electorate reacts to it. For risk-averse voters, the distance between two competing parties influences the impact of an ε valence shock on their voting choices. Following Groseclose [2001]:

> When one candidate, say [A], is superior on valence characteristics, it is possible for a voter to prefer [B]'s policy more yet vote for [A]. I call such voters *Stokes voters*, and I define the *Stokes region* as the set of ideal points that represent Stokes voters [:864-865; italics in the original].

12 Analogous models, though with different utility structures, can be found in Groseclose [2001] and Curini [2015].

The Stokes region can be thus thought as the set of voters that, because of a valence differential, choose a certain candidate while being ideologically closer to another one. In Figures 2.1, the black segments on the x-axes represent the change in size of the Stokes region following an ε valence shock; its size represents the amount of votes that are lost by party A, to the advantage of party B. The difference between Figures 2.1a and 2.1b lies in the ideological distance between the candidates: when they are relatively distant, the change in the Stokes region is relatively small; when instead the distance between the two parties shrinks, the amount of votes lost by candidate A grows considerably. For a voter located in the [A, B] interval, the cost of changing voting choice is higher when the parties are distant, while it is comparatively lower when an ideologically similar competitor is available. It follows that the importance of valence issues for each competing party increases as their ideological distance diminishes [Groseclose 2001; Curini 2015]. When parties are ideologically cohesive, a small variation in the valence capital of a candidate can change the outcome of an election.

Figure 2.2. Effects of a negative valence shock in a multiparty legislature.



2.2a. 2.2b.

For unidimensional models of multiparty systems, the same conclusions can be drawn, with each

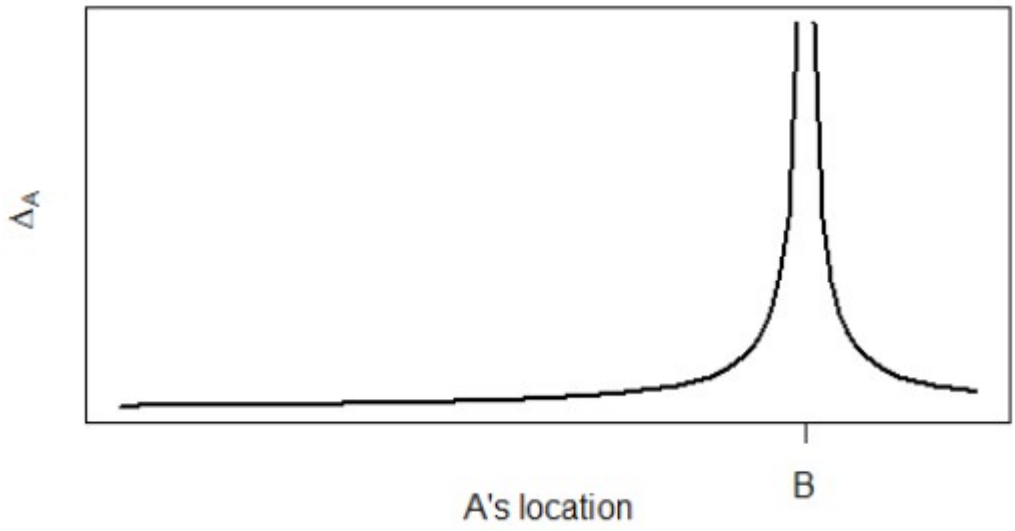
party on the ideological spectrum worrying about the distance between their adjacent parties [Curini 2015:170-176]. This case is represented in Figure 2.2.

This argument can be easily generalized: assuming a valence shock happened for party A, it is possible to individuate the change in size of the Stokes region, Δ_A, in the following way:

$$\Delta_A = \frac{\epsilon}{2|A-B|} \tag{2.2}$$

A demonstration showing the origins of this formula is available in Appendix A. As shown in Figure 2.3, the cost of a negative valence shock rises exponentially as A approaches B, and decreases at the same pace beyond that point.

Figure 2.3. Effects of a negative valence shock as the parties' ideological distance changes.



Note: The parameter values used for this plot are the same used for Figure 2.1; R = 4; ε = 1.8.

The variation in the size of the Stokes region that follows a negative valence shock represents a good theoretical description of the popularity cost an incumbent pays by making choices, such as

calling a snap election, that are perceived by the electorate as self-interested and manipulative. This makes possible to formulate some predictions on the magnitude of this cost.

Predictions

Given the insights provided by the valence models of spatial competition previously mentioned above, it is possible to formulate the central hypothesis of this paper: if we assume that a prime minister that calls a snap election will be considered opportunistic by the electorate, causing a loss in her valence capital, then it follows that the closer competing candidates are to each other, the more calling a snap election will be costly, in terms of popularity and votes, for a governing party.
In more formal terms, the central hypothesis of this paper can be stated in the following way:

> (H2.1) The popularity cost of opportunistic election timing is higher as the ideological distance between parties shrinks.

The simple formal model exposed above shows that when a shock in an incumbent's valence capital happens, it translates into a loss of electoral support, which varies on the basis of the ideological distance between adjacent competitors. But what determines the magnitude of the valence shock in first place? My hypothesis is that voters consider as worthy of punishment the opportunistic act of calling a snap election. If, as Blais et al. [2004] claimed, a most of the voters struggle in distinguishing between a regular election and one that was anticipated opportunistically, then it can be assumed that the popularity shock for the incumbent party that tears the government down is

greater the more an election is called away from the constitutionally mandated election day. In other words, the more an election is called ahead of time, with respect of the regular termination of the legislature, the clearer will be, even for the less sophisticated voters, that the termination of the government was caused by the opportunistic intentions of an incumbent.

Since the constitution of every parliamentary regime establishes the length of each legislature, from each election day it is possible to predict the day of the following election as the constitution established. However, only in extremely rare cases the time between one election and another will match the constitutionally mandated one. For this reason, I claim that the difference between what is commonly known as an "early election" and a "regular election" is, in voters' eyes, just a matter of degree. This leads to the formulation of a second hypothesis:

> (H2.2) The popularity cost of opportunistic election timing is higher as the time period from the constitutionally mandated election day increases.

These hypotheses will be subject of empirical testing.

Empirical Test

Every time a legislature is close to ending, the prime minister or a government's spokeperson announces the date of the next election. Electors at that point observe the government's choice and update their voting preferences, causing a variation in the valence capital of the incumbents. Testing the main hypothesis (H2.1) thus requires a measure of voting intentions before a government

termination is called, to be compared with the actual electoral results. This measure is offered by voting intention opinion polls, that are aimed at estimating the vote shares that each party would receive in case the elections were held at the moment of the interview. If at least a segment of the electorate changes voting preferences after a snap election is called, this change would be noted in the difference between the shares from the opinion poll forecasts and the final vote shares. Following this methodology, a dependent variable that captures the *popularity shock* an incumbent party receives after calling an election was operationalized. This variable is meant to capture the shift from the popularity levels of a governing party, signaled by an opinion poll before an election day is announced, and its popularity levels in the aftermath of the election call.

I first collected opinion polls from nine countries: Australia, Austria, Canada, Denmark, Germany, Ireland, Portugal, Spain and the United Kingdom, for a total of fifty-nine governing parties in fourty-five lections. For each election in the dataset, I noted the day in which a new election was announced to the general public, and collected the voting intention forecasts published by the available polling institutes up to a wee up to a week before that day. A mean of these forecasts was then taken for each incument party, as an estimate of their popularity prior to the election call; the difference between their shares and the actual vote shares each party got in the following election was then measured. The variable *popularity shock* therefore represents, for each governing party in each election of the dataset, a measurement of how voting intentions changed around the time of an election call. Dates of terminations were taken from Parline, the Inter Parliamentary Union database on national parliaments, and the ParlGov database; missing information was added from news sources.[13] Additionaly, I extended the main dataset available to other incumbent-elections, collecting the last opinion polls available before an election call, up to a month before that date. This allowed to add twelve other incumbent-election observations, tha I employed for a second, separate analysis. The extended dataset includes the incument parties in fifty-five elections in the same countries listed above, with the addition of the 2011 Finnish election.

13 Sources on general elections and voting intention opinion polls are available in Appendix C.

Following this central hypothesis, the main explanatory variable must express the ideological closeness of each party to its competitors. It is a variable used to capture the ideological *proximity* of contiguous parties. With reference to an hypothetical three party legislature where a centrist party (C) is located between a leftist (L) and a rightist (R) competitor (L < C < R), the *proximity* values for the centrist party at the election *j* are:

$$PROXIMITY_{Cj} = \frac{1}{1+|R_j - C_j|} + \frac{1}{1+|C_j - L_j|}$$

The value that *proximity* takes, for each party in a given election, is the sum of the reciprocals of the absolute distances between that party and its continguous competitor, increased by one. The unitary increment in the denominator has been introduced in order to account for those rare cases in which two or more parties have the same ideological position. Before computing the *proximity* values, all those parties that received a vote share inferior to 2% were excluded. The natural logarithm of this measure was taken, in order to normalize its distribution. In order to measure party positions, the "*rile*" coefficients, from the Comparative Manifesto Project (MPD) dataset, were used to index a party's ideological location on a general left-right axis. MPD scores allowed the gathering of the largest dataset available, and to simultaneously include opinion polls published around the same elections that Smith [2003, 2004] and Blais et al. [2004] covered in their empirical research. On the basis of the predictions of the model specified above, a negative association between this variable and *popularity shock* is expected: the more an incumbet is ideologically close to its competitors, the more a manipulative action will be costly, in terms of support.

The test of H2.2 requires the introduction of a separate explanatory variable. For this purpose, a continuous variable that measures how distant in time an election happened with respect to the constitutionally mandated election day was used. Its values have been computed as follows: first, the length of each legislature was standardized by finding the ratio between its actual duration

and its ideal, constitutionally mandated duration (both measured in days). The resulting ratio coefficient takes the value of 1 when a legislature lasts the exact number of days as established by the constitution of that country. This ratio doesn't range from 0 to 1, as might be expected, since in few cases some legislatures lasted slightly longer than the constitutionally mandated length.[14] Second, the absolute difference between 1 and the actual normalized legislative length ratios was taken. This variable, labeled *time distance*, measures a standardized distance between the constitutionally mandated duration of the legislature and the actual one, for each election in the dataset. A negative association between this variable and *popularity shock* is expected, as the higher the temporal distance between an election and its contitutionally mandated length, the more obvious it will be to the electorate that the election was called for exceptional reasons, because of the will of government leaders.

Another variable to be included in the test is the *voter turnout* level of each election. This variable is of crucial importance, since several electors that have been dissatisfied by the government's actions might choose to abstain from voting, rather than opting for competing candidates. This variable is calculated, for each country-election, as the ratio between the number of valid votes cast and the number of citizens eligible to vote.[15, 16] Data has been taken from the

14 In my dataset, it is the case of 2007 Australian election, that lasted fourty-six days more than the three years established by the Constitution of that country. Its corresponding length ratio is 1.042.

15 The choice of the number of valid votes is not random: in parliamentary systems several voters, once at the polls, leave their ballor paper blank, as a form of protest towards the political system. Given that this form of "protest vote" is extremely common, and that these voters don't have any real intention of casting a vote for any political party, *voter turnout* was calculated using the number of valid votes, instead of their total number.

16 In some countries, such as Australia in the present dataset, voting is compulsory: every member of the electorate that chooses to abstain from voting is punished with a small fee. This feature can explain the comparatively high levels of voter turnout in Australia (in the dataset, never lower than 87.7%). I argue that this peculiarity of Australian politics doesn't represent a problem for the empirical test, given that its

ParlGov online database. *Voter turnout* is expected to be positively associated with the dependent variable: some voters, being deluded by the government, might choose to abstain from voting rather than opting for a rival candidate. In other words, lower voter turnouts should correspond to an elevated cost for the governing party.

Using the same sources on election calls and dates outlined above, a variable measuring the temporal length of the electoral campaign is included, counting the number of days between the announcement of the election and the actual election day. If the government calls a snap election and brings the country to the polls within a short time, it is likely that the popularity shock for the incumbents will be higher. A longer electoral campaign might provide government parties with enough time to organize an efficient electoral campaign and recover the support of some voters. Given these assumptions, a positive correlation of *campaign length* with *popularity shock* is to be expected.

I also included two different dummy variables in order to control for *minority* and *oversized* governments. Since they are by nature unstable [see e.g. Strøm 1990], one can assume voters might more reasonably forgive the leaders of a non-minimum winning coalition ending ahead of its mandate.

The statistical model employed is a linear OLS regression with roubust standard errors. Country-fixed effects are included in the models.[17] The results are shown in Table 2.1, where Models 2.1 and 2.2 confirm the main hypotheses.

Proximity is negatively correlated with *popularity shock*; this supports the assumption that ideological closeness makes the punishment by dissatisfied voters less costly. H2.1 is thus confirmed.

---

purpuse is not to investigate what factors affect voter turnout, but only its association with *popularity shock*.

17 The *Finland* dummy variable in Model 2.2 is not included because of its multicollinearity with the *oversized* variable.

Table 2.1. Determinants of *popularity shock*.

	Model 2.1 (weekly means)	Model 2.2 (extended test)
Proximity	–0.844 * (0.446)	–0.783 ** (0.389)
Time distance	–0.701 * (0.394)	–0.836 ** (0.351)
Voter turnout	0.211 (0.164)	0.212 (0.133)
Campaign length	0.007 (0.113)	–0.032 (0.102)
Minority	–0.814 (1.922)	–1.108 (1.736)
Oversized		1.234 (1.155)
Intercept	–21.215 (14.152)	–20.418 * (11.317)
Australia	–1.808 (3.305)	–2.027 (2.713)
Austria	1.750 (6.230)	3.840 (5.478)
Canada	4.005 (3.193)	4.873 (3.037)
Denmark	1.120 (2.672)	1.138 (2.365)
Germany	5.582 (11.358)	9.259 (10.283)
Ireland	7.072 *** (2.185)	5.802 *** (1.995)
Portugal	3.376 (5.512)	7.287 (5.975)
Spain	1.514 (7.138)	2.975 (6.386)
N	59	71
R^2	0.334	0.278

* p < 0.1. ** p < 0.05. *** p < 0.01.

The coefficient of *time distance* corroborates the hypothesis that when an election is widely anticipated, even the most uninformed voters seem to understand that the election was caused by the will of government leaders. This coefficient is perfectly in line with the predictions of the valence theory exposed above, and represents also a partial confirmation of Smith's results, who concluded

that voters tend to punish those prime ministers that call elections earlier than expected [2003:317]. *Voter turnout* shows the expected sign in both cases, but didn't reach statistical significance; *campaign length* doesn't show a statistically significance impact as well.

In conclusion, Models 2.1 and 2.2 confirm the hypotheses formulated above, showing how measures of ideological proximity successfully explain variations in the popularity shock of incumbent parties after their call for a snap election, and how the reaction of the electorate can be captured by the temporal distance between each general election and its respective constitutionally mandated election day.

What Happened in Canada?

As explained in the literature review, Blais et al. [2004] didn't find evidence of a significant popularity cost of calling a snap election for the Canadian prime minister Chrètien for the early election he called in 2000. This goes against the predictions of Smith [2003], who found that voters in the United Kingdom tend to punish those prime ministers who call an election earlier than expected [:412-417]. How to explain this discrepancy? The 2000 Canadian election deserves a more thorough analysis.

The formal model exposed above describes how the cost of calling a snap election, expressed as a negative shock in the valence capital of an incumbent candidate, is not something fixed and ever present, but variable in nature and subject to several determinants. On the basis of the insights herein, it is possible to solve an open dilemma that characterized the literature on election timing.

The research by Blais et al. [2004] is impeccable, and the validity of their conclusions are not in question, but the empirical findings noted here, forecasting the existence of a popularity cost of calling a snap election of variable magnitude, only seem to be in contradiction with the conclusions they reached. Moreover, a model that is meant to explain variations in the magnitude of this popularity cost must also be able to explain why in other cases this cost was minimal. The first step is to observe the predictions of Model 2.1 and 2.2 with respect to the Canadian case study, and to check if they correspond with the conclusions of Blais et al. [2004]. From its capacity to account for a particular case such as the 2000 Canadian early election, it will be possible to judge its heuristic validity. As it will be shown, the case of the 2000 Canadian election fits perfectly with the empirical results reached here.

I started collecting the values of proximity and time distance on the twenty-three post war Canadian elections (1945-2015).[18] In particular, the time distance values have been calculated twice: first, treating the maximum length of Canadian elections as of five years, as expressed in the constitution; secondly, as Canadian legislatures had a maximum term of 4 years.[19]

The Canadian norm, in fact, is that elections take place every four years [Blais et al. 2004:309]. Table 2.2 shows that in any case, the observation that corresponds to the 2000 Liberal Party is in line with the predictions of my empirical test. Chrétien's party was at a comparatively higher ideological distance from its competitors, and at a temporal distance from the constitutionally mandated election day shorter than the country's average.

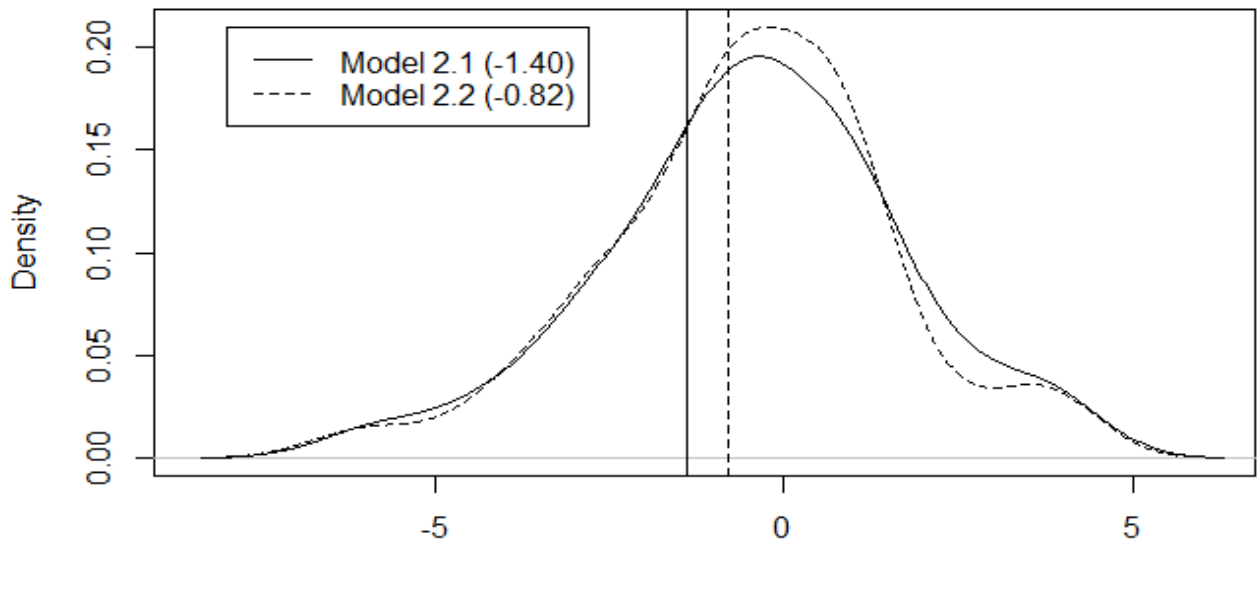
18 The methodology employed for the computation of the *proximity* values is the same as before: each party with less than 2 percent of the votes has been excluded.

19 This methodology must exclude elections happened after the 2011 Elections Act, specifying that a elections must be held on the third Monday in the October of the fourth year after the last general elections.

Table 2.2. 2000 election standardized values.	
Variable	Z-scores
Proximity	–0.1181
Time distance (five years)	–0.1918
Time distance (four years)	–0.6220

Although analyzing single variables can be helpful, the most obvious evaluation can be made by looking at the predictions of the central empirical model. Figure 2.4 shows the density plots ot the fitted values of Models 2.1 and 2.2, together with the values corresponding to the 2000 Canadian election's forecasts of *popularity shock*.

Figure 2.4. Density plot of Models 2.1 and 2.2 fitted values



Note: Models' forecasts of *popularity shock* in parentheses.

It is visually clear how the empirical models proposed herein can predict the case of prime minister

Chétien with surprising precision. Its fitted value approximates zero, meaning a complete lack of a popularity cost for prime minister Chrétien. The *popularity shock* forecast for the Liberal party of Canada in 2000 falls very close to the negligible popularity cost that was estimated by Blais et al.:

> According to our estimates, 1 percent of the voters, and 2 percent of those who would have voted Liberal in the absence of resentment, switched to another party because they disapproved of the prime minister's decision...
>
> All in all, then, very few voters punished the prime minister for calling a snap election, and the Liberals suffered a very small loss of one percentage point. Punishment there was, but the penalty was quite small [2004:316].

As Blais et al. themselves found [2004], only a small fraction of informed voters understood that the Canadian prime minister behaved opportunistically. As they stated:

> The Canadian case indicates that some voters do react negatively when a prime minister calls an election at an 'inappropriate' time, and that such resentment can move some voters to switch to the opposition parties. But this study also suggests that the electoral cost to the incumbent party is mitigated by the reality that many voters do not follow politics; they are likely to be unaware that the election is early, and they are less likely to care [Blais et al. 2004 :317].

Their conclusion perfectly matches mine: it appears that the early termination, in that case, was so close to the official termination of the legislature, that for most of the voters the snap election called was indistinguishable from a regular one.

With the more general explanation provided, this paper showes why Smith [1996, 2003, 2004] and Blais et al. [2004] are both right in their different conclusions. Both the 2000 Canadian

case study analyzed by the Blais et al., and the analyses provided by Smith on the opportunistic timing of elections in United Kingdom represent particular cases of a more general phenomenon that this valence theory is able to account for.

Conclusions

In parlamentary systems, government parties enjoy the power to either influence or determine the timing of general elections. Calling a snap election is a choice that an incumbent takes in order to take advantage of a peak in popularity, or in order to remedy for a loss of consensus, but the final goal is always to maximize the chances of reelection. The choice of going to the polls ahead of time is associated to a popularity cost, however and voters thend to negatively judge those government leaders that behave in such an opportunistc way. A prime minister that calls an election earlier than expected may be accused of putting to personal interests before the needs of the nation that he or she represents.

The present chapter examined the magnitude of this popularity cost. This topic is surprisingly unresearched, and no comparative research had ever been conducted before. Moreover, the few previous works published collected very scarce evidence and reached contradictory results [Smith 1996, 2003, 2004; Blais et al. 2004]. This chapter develops a novel theory that can explain variations of its magnitude. The formal model presented above linked, for the first time in the literature, the problem of opportunistic election timing with valence theories of spatial competition. It was shown how the popularity loss that follows the call of an early election can be described as a negative shock in the valence capital of the incumbent, and that the magnitude of this cost can be

effectively expressed as a variation in the size of the Stokes region, i.e.: that set of voters that choose not to vote for the ideologically closer candidate because of a valence differential [Groseclose 2001]. This model allowed the formulation of a fundamental prediction: "the popularity cost of opportunistic election timing is higher as the ideological distance between parties shrinks", together with a series of corollary hypotheses. All of my predictions have been confirmed by the first comparative test run on this topic.

The analysis covered a total of fifty-five parliamentary election from ten countries, United Kingdom and Canada included. Government parties are found to suffer greater popularity losses when ideologically closer to other competitors, and when the election called is more distant in time from the constittionally mandated election day.

Once the predictions of this model have been successfully tested, it was possibile to solve an unanswered problem in the literature. My valence theory, together with the insights provided by the main empirical test, help explain why in the 2000 Canadian election the popularity shock for prime minister Chrétien was negligible, and to reconcile the empirical results found by Smith [2003, 2004], and the ones from Blais et al. [2004]. The raw predictions of this main empirical model describe the Chrétien's case with great precision. With respect to the subgroup of Canadian observation from my main dataset, the 2000 election represents a special case: its *proximity* values are among the lowest, meaning that for unhappy supporters of the Liberal party, switching from Chrétien to another candidate was comparatively more costly; and the distance between the snap election day and the respective constitutionally mandated election day was lower than in other cases, making it harder for uninformed voters to distinguish that election from a regular one.

All the evidence gathered suggests that in 2000, prime minister Chrétien was in a situation that was singularly favourable for the call of a snap election. The empirical findings from the different works of Smith [2003, 2004] and Blais et al. [2004], thus, do not contradict each other, but represent specific cases of a more general phenomenon that this valence theory was able to

describe. This might finally put an end to the debate over the existence and the magnitude of the popularity cost of calling a snap election, a question that has been asked since 2004 at least.

The arguments stated here about the role that valence issues play on the likelihood of a cabinet termination, if generalized, can produce interesting insights on coalition theory and cabinet stability. Why ideologically compact calitions of competitive parties stand longer than others? From the traditional works of voting models [Black 1958, Arrow 1951; McKelvey 1976] it can be inferred that members of a relatively cohesive group of parties competing on one, or more than one continuous ideological dimensions are by no means less litigious and combative than members of a more heterogeneous group. From the simple valence model herein it can be inferred that ideologically compact coalitions last longer not just because they tend to produce less costly agreements for the parties involved, but also because the valence shock that would be paid in case of their opportunistic termination could make it too costly to opt out. Moreover, this model allows for a new explanation of why minority governments are comparatively more unstable than minimal winning coalitions: a non-governing party providing external support to a cabinet could cause the end of the cabinet without paying a valence cost. All these insights should become the object of future research.

Chapter 3

A Formal Model of Cabinet Termination in Consensual Parliamentary Systems

In Chapter 2 it was showed how valence issues can be incorporated in a formal theory of election timing in parliamentary systems, and how this allowed for both theoretical and empirical improvements. This chapter is meant to generalize the theoretical insights of the previous, in order to achieve a general theory of election timing in complex parliamentary systems.

Consensual democracies are often charachterized by more than one party at the government. The formation of coalitions is due to the strongly proportional nature of those electoral systems, often leading to situations in which no party represented in the parliament controls the absolute majority of the seats. Once the cabinet has been formed and portoflios have been allocated, coalition partners negotiate over a policy agreement. During the legislature though, this agreement can be changed by the parties; nothing stops a member of the coalition the reject the initial agreement but her self-interested compliance. In fact, once a new cabinet is established and the initial agreement is found, government parties find themselves in a continuous bargain over public policies. The outcome of this negotiation depends also on another option that is available for each government party: a coalition member can choose, in any moment of the legislature, to withdraw from the government coalition and open a government crisis. In some cases, a government crisis

can lead to the establishment of a new cabinet, supported by a different government coalition, while in other cases it can determine a premature termination of the legislature, forcing voters to go to the polls ahead of time.

A cabinet termination might not have the same value for each member of the coalition. If opinion polls forecasts tell to government leaders that one of the incumbent parties enjoys a strong advantage with respect to other coalition partners, this will provide that party with a strong bargaining weight that can be exploited in order to obtain more favourable agreements. A party that is advantaged by the termination of the coalition can extort policy concessions from the disadvantaged partners, in exchange of government stability. These observations are perfectly in line with the theoretical insights provided Lupia and Strom [1995] and Diermeier and Stevenson [2000], according to which the threat of a snap election can be exploited by incumbents in order to extract policy benefits form electorally disadvantages parties.

These dynamics of parliamentary politics can be intuitively represented as a non-cooperative bargaining game. Incumbent members of the cabinet can be seen as a set of self-interested players, bargaining over a policy surplus, or the set of potential public policies that players find more convenient of the status quo; provided the existence of an exit option, or disagreement point, i.e.: the utility that each player realized in case the negotiation fails. Such a game is based on a constant *blackmailing relationship* among coalition partners, in which who can credibly threaten to terminate the government ahead of time can exploit her electoral advantage in order to obtain more favourable policies. In each moment of the legislature, government party leaders can choose between withdrawing from the coalition and open a government crisis, or keeping the cabinet alive and negotiate over public policies.

There are several ways that can lead an incumbent to cause a negotiation failure: first, a party can choose to terminate the cabinet and bring the country to the polls in order to not loose too many votes; second, a popular party might choose to step out of the cabinet in order to maximize

her electoral gains before it is too late [Smith 2004]. In any of these cases, electoral expectations appear to be the main determinant of opportunistic election timing. This leads to the conclusion that it must be possible to explain the likelihood of cabinet termination by looking at the variation in parties' electoral expectations.

After having provided a general description of the theoretical problem that I am going to investigate, the chapter continues as follows: first, I will expose the bargaining game that constitutes the pillar of my valence theory of election timing; second, I will deduce some prediction that will be tested empirically on a comparative dataset. A commentary will conclude.

Structure of the Game

The structure of the game that I am going to outline takes, as a starting point, the valence model explained in Chapter 2. More specifically, it is the case of a multiparty legislature, as represented in Figure 2.2. A unidimensional model of this kind allows to represent, at the same time, the utility functions of a set of candidates competing on a general ideological space, and the utility of a continuous set of voters that are uniformly distributed over the ideological axis. Each voter's utility functions corresponds to equation (2.1).

The game is composed of three players: A is the prime minister's party, leading the coalition; B is the coalition partner; C is the opposition party. The game starts after the newly formed cabinet is established, and the allocation of portfolios and the coalition agreement over public policies are approved.

In every moment of the legislature, any party P's instantaneous utility is:

$$u_P^t = G\lambda_P - (P-x)^2 + \nu_P \quad , \tag{3.1}$$

where:

P represents the party's ideal point.

x is the public policy agreement, found on a single-dimensional ideological space; its quadratic distance from P's ideal point represents her policy-seeking utility.

G is the total office utility available from governing, while λ_P is the office-seeking share of party P, taken from the vector of office shares $\Lambda = (\lambda_A, \lambda_B, \lambda_C)$. In this specific game: $\lambda_C=0$, and $\lambda_A+\lambda_B=1$; the two elements combined represent the office utility of party P.

ν_P represents the valence capital of the party. Without lack of generality and for mathematical convenience, I state any ν_P is high enough to have always positive values for the players' utility functions throughout the game[20,21].

The actors play in time, which is represented by a variable t = 1, ... ,T; where T represents the maximum length of the legislature.

The structure of a first game is depicted in Figure 3.1. The sequence of moves is, for each round t, as follows:

20 For negative values the discount factors in the game will increase, rather than decrease, the players' utilities in time, leading to absurd results.

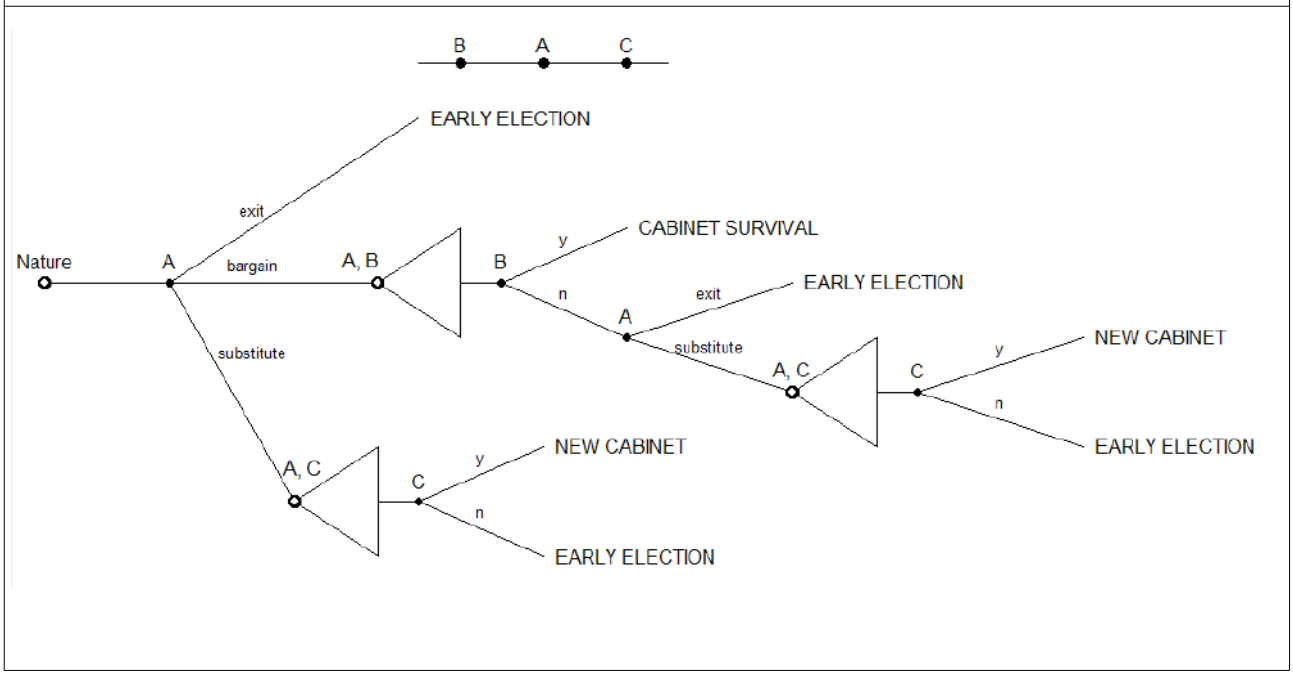
21 It might be objected that the valence capital of a party should enter the utility functions of the voters alone, not to one of candidates; the valence capital is one of those elements that a voter weights in choosing a candidate at the polls. A high valence capital is thus useful for the candidate, but only as a function of her future office and policy utilities, not *per se*. Even though these are reasonable arguments, I consider that including the valence capital in the partie's utiliy functions is not an error: it is not counterintuitive to assume parties and candidates to enjoy high reputation. For most politicians, and for prime ministers in particular, going down in history as a very honest and competent politician, rather than a "rascal", is of fundamental importance. For this reason, valence capital enters additively in the utility function of parties and candidates.

(i) First, Nature reveals parties' popularity, i.e.: generates the values of the exit option.

(ii) Second, the prime minister's party makes a move, choosing between bargaining over policies with her coalition partner B; substituting the existing coalition and forming a new cabinet with C; or calling a snap election.

(iii) Third, in case the prime minister didn't call a snap election, B and C play their respective bargaining games with A, leading to outcomes they can accept or refuse.

Figure 3.1. Game Tree 1.



It must be noted that in this game the prime minister party is in a centrist position. Being the pivotal party the process of coalition formation, i.e.: when no possible coalition can exclude A, the prime minister is in a significant bargaining advantage.

But this game doesn't exhaust all the possible situations that can be analyze by my theory. If the prime minister's party is instead located in a non pivotal position, as in Games 2 and 3, the rules of the game change. What makes the difference here are the prime minister prerogatives of directly

calling a early election.

Figure 3.2. Game Tree 2.

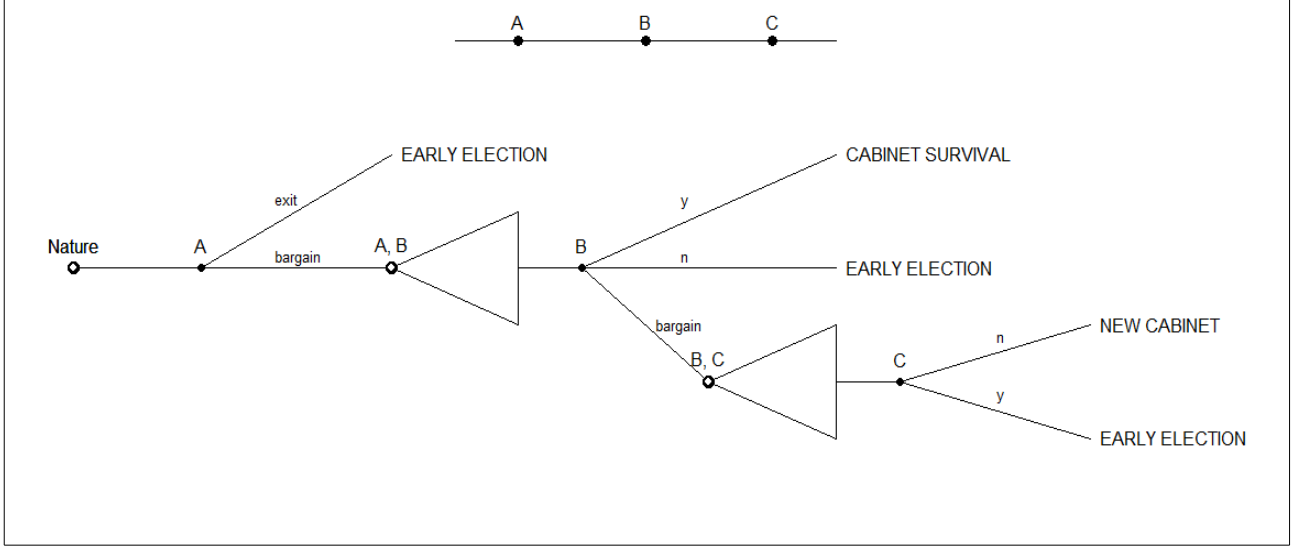
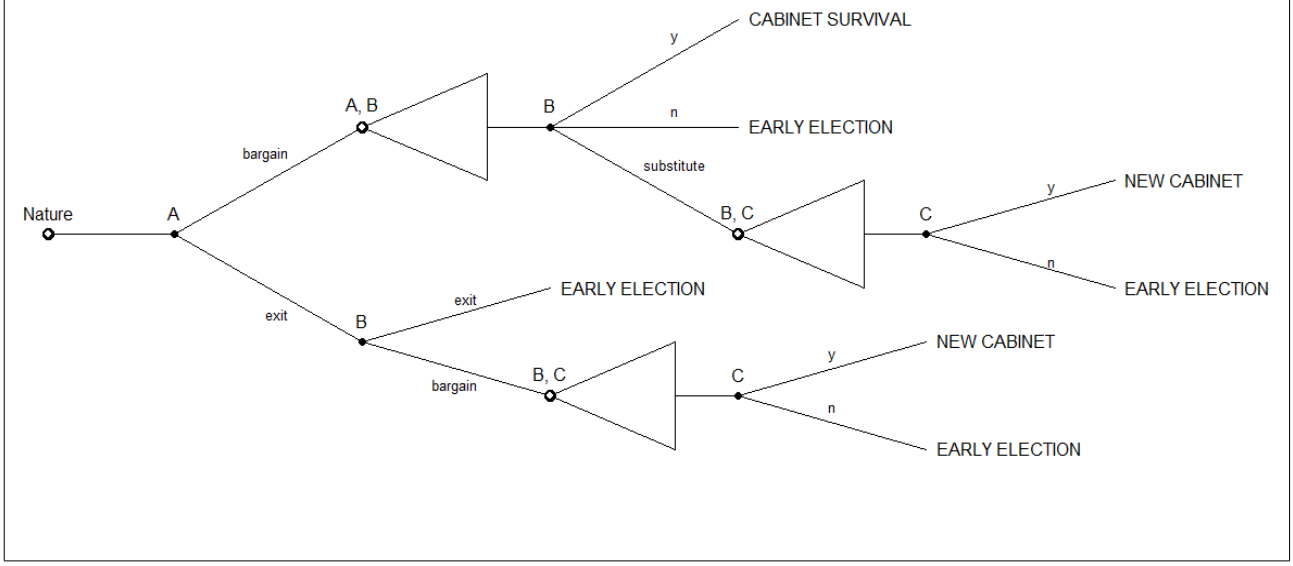


Figure 3.3. Game Tree 3.



The difference between Game 2 and Game 3 deserves a further explanation. In some political systems the Head of the state is a non-partisan political actor. It is the case of monarchs, such as in Denmark or the Netherlands, where real election timing powers are in the hands of the

government's elected officials, or the prime minister alone. This is due to the fact that in modern constitutional monarchies the role of kings and queens is purely representative one; as a matter of fact, they limit themselves to execute the will of the prime minister or the cabinet.

In case of those polities charachterized by a partisan Head of the State instead, such as Austria and Italy, the political game is more complex: the Head of the State has a real dissolution powers, that can be used in order to oppose the will of the prime minister, restraining the call of a snap election. A legislature cannot be dissolved without his approval. In those countries in which the Head of the State is non partisan, thus, prime ministers, and incumbents in general, don't have the same freedom in timing general elections. It is thus necessary to distinguish between polities in which the prime minister has the power to unilaterally terminate the cabinet (Game 2), and those in which the dissolution powers are in the hands of the Head of the State (Game 3).

In the next section I will expound the foundations of a simple bargaining subgame that constitutes the theoretical core of the present model. In fact, all the three games are charachterized by one or more bargaining interaction among players, each following the same pattern.

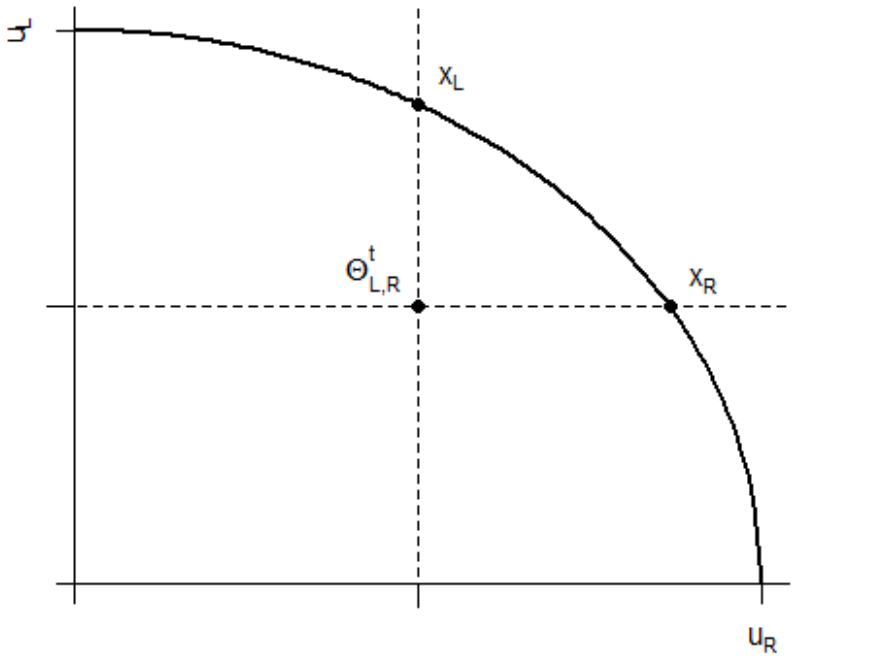
Bargaining over Policies

As it was outlined in the introduction, government parties are involved in a continuous bargaining on public policies. The set of all possible outcomes can be represented on a cartesian plane as a utility curve, which represents the competitive, non-cooperative nature of the game. The axes represent the utility of each player. On the same plane, it is possible, for both the players in the negotiation, to locate an exit option Θ^{t}_{LR} that represents parties' exit values. The position of the

exit option on the bargaining space allows us to individuate a surplus set S, i.e. a set of Pareto-optimal potential public policies on which the governing parties start a negotiation.

Mathematically speaking, when Θ^t_{LR} is below the parties' utility curve, it can be statet that: $S=\{ x \in [x_L, x_R] \}$, where x_L and x_R are the boundaries of S, as depicted in Figure 3.4. When the exit option is above the utility curve instead, no public policy available is Pareto-optimal for the players, i.e. no point on the utility curve satisfies both the parties involved; therefore, $S = \{\varnothing\}$.

Figure 3.4. Bargaining surplus on the parties' utility curves.



This bargaining subgame is thus played not on the whole utility curve, by only on the non-empty surplus projected by the exit option in the bargaining space. The remaining policies on the utility curve do not represent credible alternatives for the parties involved. As it will be shown below, this subgame can lead to three alternative outcomes: a conservation of the status quo policy; a new policy agreement, different from the previous one; or a failure of the negotiation, in case no policy

agreement can be found.

In order to keep the model simple, I assume coalition parties with equal bargaining weights to find the middle point among the surplus set S. For a more mathematically refined model, I could have specified a series of different bargaining weights, justified, for example, on the basis of an unequal distribution of office benefits or values for the exit option. Otherwise, I could have used the Rubinstein solution [1982], which is especially appropriate for the class of non-cooperative bargaining games. However, even adding these refinements, the model would have reached exactly the same conclusions. For this reason, I will keep that the outcome of a bargaining interaction from a non-empty set S, corresponds to $x_m = (x_R - x_L)\frac{1}{2}$.

From this framework, in each step of the game t, a coalition party's choice to keep the cabinet alive and to continue the negotiation on public policies is represented by a continuation value that includes the instantaneous utility given by the bargaining, and the uncertainty regarding future outcome of the negotiation in the following period t+1. The structure of this continuation value, inspired by Kayser [2005], is a quasi-recursive equation, based on the Bellman principle of optimality:

$$V_P^t(\text{bargain}) = \left[G\lambda_P - \left(P - x_m\right)^2 + \nu_P \right](T-t) \quad + \rho E\left[u_P^{t+1}\right](T-t-1) \tag{3.2}$$

The first part of the equation represents the utility of governing at time t, and it is nothing but the instantaneous utility given the current office share and policy, weighted by the amount of time left before the end of the legislature. The second part of the equation is represented by the (discounted) expected utility of playing in the following period t+1.

Because actors don't know the future positions of the exit option, the policy agreement at t+1 is unknown too. For this reason, the expected utility of governing in the following step is:

$$u_P^{t+1} = G\lambda_P - (P-\beta)^2 + \nu_P \quad , \tag{3.3}$$

given:

$$\beta \sim \text{Uniform}[L, R]$$

The policy outcome β of the future bargaining interaction is not known in advance, assuming the players' ignorance about the location of the exit option in the following periods.

The outcome of the bargaining subgame depends from the position of the exit option, which deserves a deeper analysis. In order to be represented on the bargaining space, the exit option of a bargaining game must be defined as a vector of continuation values, one for each players, representing what value each player would get from a negotiation failure. This value, for each player, can correspond to a substitution of the current cabinet or to an anticipated election, depending on the type of game and on the parties' electoral expectations. In the next paragraphs I will examine the other moves available for the players.

Substitution of the Governing Coalition

The structure of the utility of a party who chooses to substitute the current governing coalition with a new one is similar, but not identical to the previous bargaining interaction. Once the substitution is done, given that the preferences of the new incumbents have changed, a new policy agreement is to be found through the same bargaining game exposed above. However, forming a new governing coalition also means a reshuffle of the previous cabinet, with a allocation of portfolios that is

associated with a redistribution of office benefits. How this reallocation happens is based on the intuitive assumption that office benefits are distributed among coalition partners on the basis of their bargainig weights at the moment of cabinet formation. In other words, once a governing party chooses to end the current coalition and forms a new cabinet with an opposition party, the new office shares distribution will depend from the electoral advantage of one party over the other.

Let us take the example of the three-party legislature depicted in Figure 2.2 (L<P<R), and assume that party P is governing in a coalition with L. The status quo distribution of office shares is described as $\Lambda = (\lambda_L, \lambda_P, 0)$. If P chooses to exit the coalition and form a new cabinet with R, the new office shares will be distributed on the basis of the value each party gets by opting out of the negotiation. In other words, the new office shares would be:

$$\lambda_P^o = \frac{V_P^t(\text{exit})}{V_P^t(\text{exit}) + V_R^t(\text{exit})} \quad , \quad \lambda_R^o = \frac{V_R^t(\text{exit})}{V_P^t(\text{exit}) + V_R^t(\text{exit})} \qquad \text{(3.4a), (3.4b)}$$

These formulas are motivated in the following way: the party that sees anticipated elections as an advantageous option is in a stronger position than a party that would likely suffer a loss from it. The shares vector Λ will thus be substituted by a new $\Lambda^\circ=(0, \lambda^\circ_P, \lambda^\circ_R)$.[22] The substitution of the old cabinet with a new one, together with a new policy agreement, will thus generate the following utility for each party P:

22 The new vector of office shares, as described by equations (3.4) seems to be in contrast witht Gamson law, that predicts a distribution of office benefits, among coalition parties, that is proportional to the number of parliamentary seats each party controls. I claim this feature of the present model doesn't contitute a problem, for at least two reasons. First, a greater parliamentary size for a party entails, all things equal, stronger bargaining powers (as predicted by the model) and a larger share of office benefits (as predicted by Gamson law). Second, it represents an affordable simplification of reality: the differences from what predicted by Gamson law do not alter the conclusions of the model, that will be presented below. For these reasons, I assume there is not reason to further complicate it.

$$V_P^t(\text{substitute}) = \left[G\lambda_P^o - \left(P - x_m^o \right)^2 + \nu_P \right](T-t) \quad + \rho E\left[u_P^{t+1} \right](T-t-1) \tag{3.5}$$

Equation (3.5) is similar to equation (3.2), but it comprehends new office shares vector Λ° and a new policy agreement x_m^o is found between the new parties involved.

Calling a Snap Election

This part of the model is broadly based on the insights of the valence theory reported in chapter 2. When party P chooses to withdraw from the governing coalition, causing the occurrence of anticipated elections, its utility is represented by a value that is a function of the exit value of the current moment, minus the stochastic valence cost caused by the opportunistic behavior of the party:

$$V_P^t(\text{exit}) = \left\{ \omega_P^{t+1} - \left(\frac{T-t}{T} \right) E\left[\Delta_P \right] \right\} T \tag{3.6}$$

This value is composed of three elements. First, the exit value of the bargaining game of the current round ω_P^t which is, theoretically speaking, a combination of expected office and policy utilities. To keep the model simple, I will define the whole vector of exit values $\Omega^t = \{\omega_A^t, \omega_B^t, \omega_C^t\}$ as known by the players. Second, following the nomenclature of chapter 2, the term Δ_P represents the

variation in the size of the Stokes region due to the valence loss of the party that causes a government termination. The value of Δ_P was proven to change as the ideological distance between a party and its adjacent competitors changes.

In case the party P is at the extreme of the ideological axis, the cost of an ε valence shock is calculated as:

$$\Delta_P = \frac{\epsilon_P}{2(R-P)} \tag{3.7}$$

Where R is a generic party located at its right. In case P is in a non-extremist position, but is located instead between a more lefist party L and a more rightist party R, then the variation in the size of the Stokes regions (to the left and to the right) is computed as:

$$\Delta_P = \frac{\epsilon_P}{2(P-L)} + \frac{\epsilon_P}{2(R-P)} = \frac{\epsilon_P(R-L)}{2(P-L)(R-P)} \tag{3.8}$$

In my model, the party causing cabinet termination pays a cost that depends from a stochastic valence shock represented by ε:

$$\epsilon \sim \text{Uniform}[0, \tilde{\epsilon}]$$

Where $\tilde{\tilde{\varepsilon}}$ represents the degree of volatility of the party system, or how uncertain voters are. Given equation 2.2, it follows that:

$$\Delta_P = \frac{\epsilon_P}{2(R-P)} \tag{3.9a}$$

in case P is an extreme party, and;

$$\Delta_P = \frac{\epsilon_P (R-L)}{2(P-L)(R-P)} \tag{3.9b}$$

in case P is located in a non-extreme position. The third element of a party's exit value is represented by a discount factor that reduces the valence cost of calling a snap election the more ot is called close to its respective constitutionally mandated termination. The term [(T-t)/T] shrinks the value of Δ_P to zero as t approaches T. The reason of this discount is based on the empirical findings of the previous chapter, where it was shown that highly anticipated elections tend to be punished more severly than the ones that have been called closer to the constitutionally mandated election day. This is also in line with the findings of Smith [2003, 2004], who showed that the more an election is called ahead of time, the more clear it will be for voters that the incumbent behaved opportunistically.

The popularity cost of calling a snap election, appropriately time-discounted, enters the player's utility function additively for two reasons: first, it allows to avoid unnecessary complications of my model; second, it saves me from making unnecessary assumptions on the ideological distribution of the electorate.

Once a party looses votes by causing an early election opportunistically, some part of the electorate will opt for other candidates, to the advantage of adjacent parties. When party P suffers from the valence shock, the parties on the left and on the right get a proportionate share of utility, weighted for an α share, capturing abstentionism:

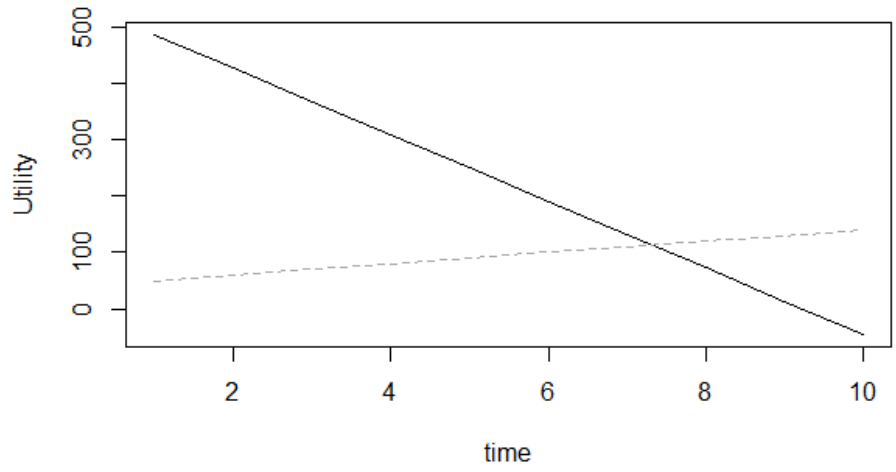
$$V_L^t(\text{exit}) = \left\{ \omega_L^{t+1} + \alpha \left(\frac{T-t}{T} \right) E[\Delta_P] \right\} \tag{3.10a}$$

$$V_R^t(\text{exit}) = \left\{ \omega_R^{t+1} + \alpha \left(\frac{T-t}{T} \right) E[\Delta_P] \right\} \tag{3.10b}$$

The importance of a decreasing cost of calling a snap election can be observed graphically. Figure 3.5 represents how two utilities (of keeping a policy throughout the game and of calling a snap election) change as time passes. The instantaneous utilities of the policy agreement and the exit value are the same; this simulation just depicts the effects of time on the model.

For each player, the value of causing a snap election and and the value of a cabinet substitution can constitute the exit option of a bargaining subgame. The pair of exit values that constitute the exit option Θ_{LR}^{t} of a bargaining subgame among two generic L and R parties, changes depending on the players electoral expectations and the rules of the game.

Figure 3.5. Cost-benefit analysis of election calling over time.



Note: Parameter values are the same used for Figure 2.2.

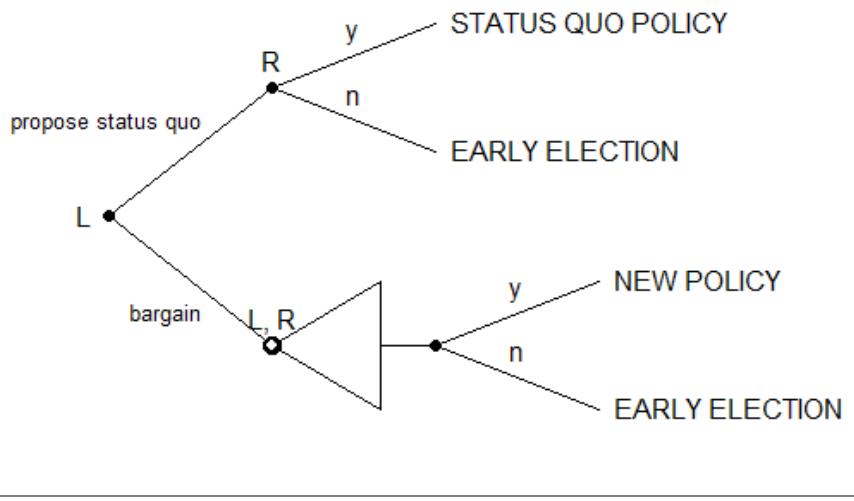
For example, in Game 1, player A will choose an optimal strategy a* among the three strategies available by solving:

$$\max_{u_A}\{\text{bargain}, \text{substitute}, \text{exit}\}$$

while for players B and C, whose only options are accepting or rejecting the outcome of their respective bargaining subgames, the exit option of is always represented by their respective exit values.

Once the players' continuation values and the nature of the exit option in bargaining subgames have been explored, it is possible to expose a solution of the bargaining game.

Figure 3.5. Bargaining subgame.



Solution of the Bargaining Subgame

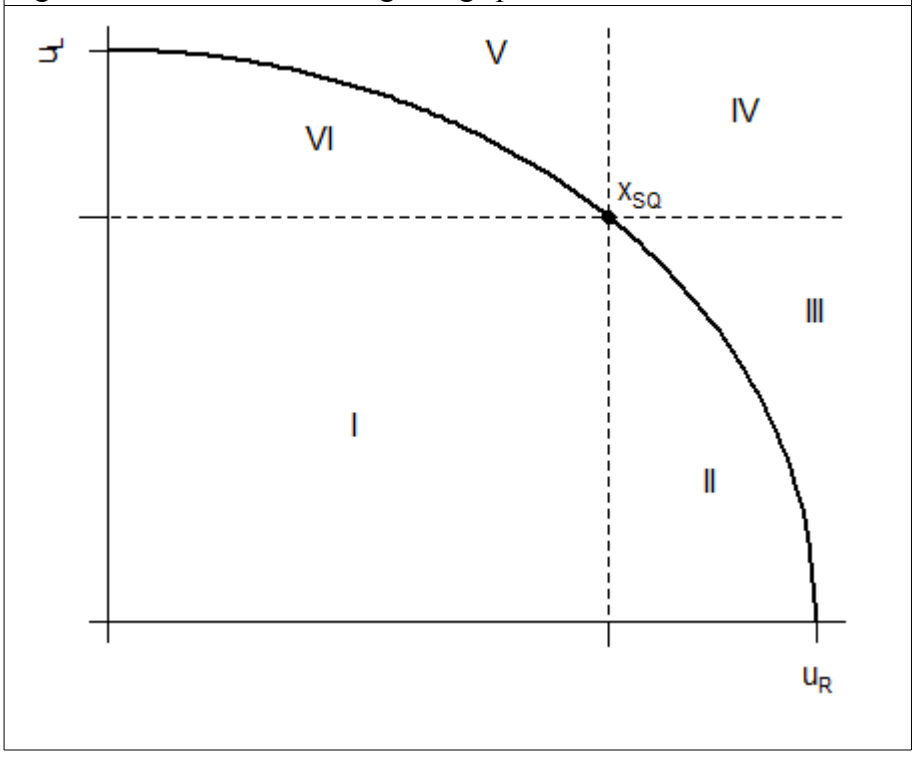
Every bargaining interaction among two players follows the same pattern, depicted in the figure below, in which a coalition is formed between a generic leftist party L (the first proposer) and a rightist party R. The proposer party can choose to terminate the coalition or to gatekeep the status

quo policy.

In order to understand how the outcome each negotiation changes we must look at the value represented by the exit option. On the basis of the location of the status quo policy, the bargaining space can be divided in six sectors. These sectors are associated with different outcomes of the game.

Sector I. Both L and R suffer from calling an early election. In this case, the likelihood of government termination is the lowest possible. Only an exogenous shock, such as a scandal or an international crisis, can tear down the cabinet. In this sector, no party can use the exit option as a credible threat. The status quo wins against any other proposal.

Figure 3.6. Sectors of the bargaining space.



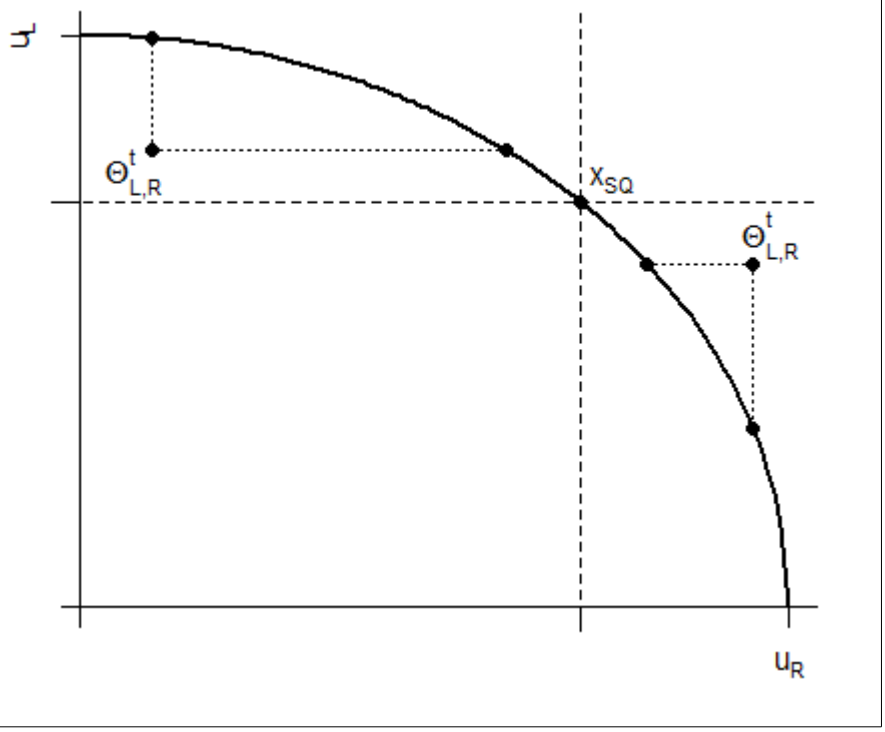
Sector II. In this case, one of the two players gains by withdrawing from the negotiation,

while the other suffers a utility loss, but there is room for a new bargaining on public policies. Player R can exploit her advantage and blackmail L, claiming more favourable policies in exchange of not terminating the cabient.

Sector III. As in the previous case, one party gains while the other suffers from exiting the coalition. The only difference is that in this case there is no room for renegotiating the policy agreement: no point in the $[x_L, x_R]$ interval Pareto-dominates the exit option.

Sector IV. Both players gain by terminating the cabinet; this situation corresponds to the highest probability of cabinet termination.

Figure 3.7. Solution and failure of a bargaining subgame (sectors III and VI).

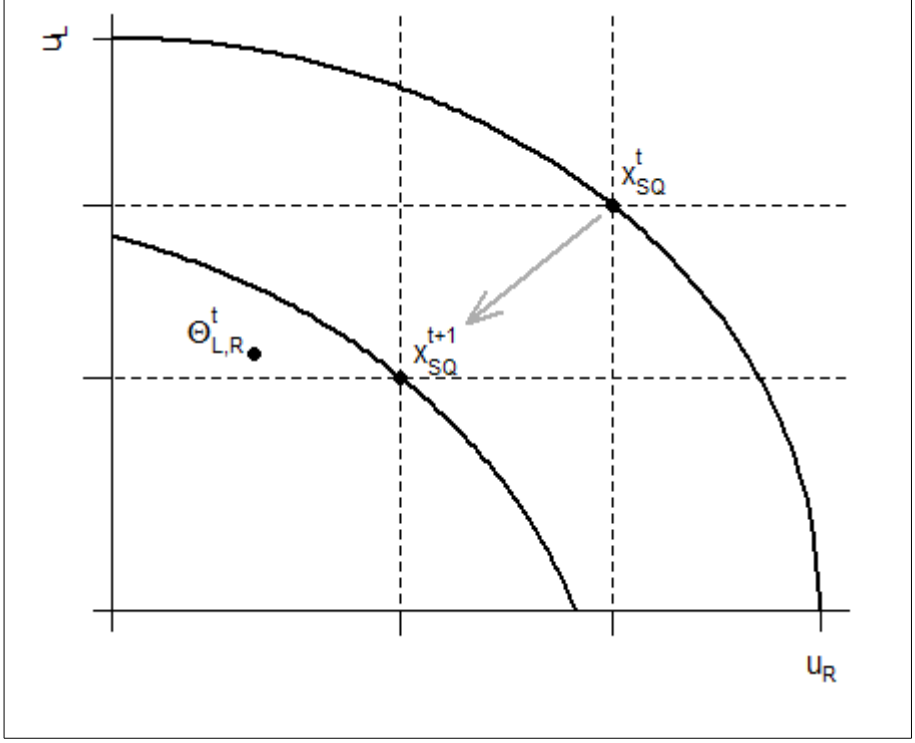


Sector V. This sector is analogous to Sector III. It represents a case in which parties cannot reach any new policy agreement.

Sector VI. This case is the mirror image of Sector II, with L advantaged over R instead. The outcome is a renegotiation on the government's public policies.

Thanks to the insights just provided, my model is able to explain why the same policy agreement, or the same location of the exit option, can lead to different outcomes of the game, if taken in different moments of the game. This can be noted graphically, with reference to Figure 3.8. Certain electoral expectations can lead to a second negotiation on public policies in an early time of the legislature, and to a bargaining failure in later times. This provides a efficacious game-theoretic description of the effects of time on the incumbent parties' negotiation on public policies.

Figure 3.8. Effect of time on players' choices.



Every bargaining subgame represents a continuation value for each player that can be described by a mapping $V_L^t = \Gamma_L\left((L,R),\Lambda,x_{SQ},\Theta^t\right)$ which is a function the players involved, the distribution of office shares (that can be changed by a cabinet substitution), the value of their exit option, the status quo policy. Its values are reported in Table 3.1.

At this point, each of the three Games can be solved by backward induction.

Table 3.1. Equilibrium solution of each bargaining subgame

	Sector	L's strategy	R's strategy	Outcome
(I)	u_L(status quo) > u_L(exit), u_R(status quo) > u_R(exit).	Propose SQ	(y, y)	Status quo policy
(II)	u_L(status quo) < u_L(exit), u_R(status quo) > u_R(exit), u_L(status quo) + u_R(status quo) > u_L(exit) + u_R(exit).	Bargain	(n, y)	New policy (R's advantage)
(III)	u_L(status quo) < u_L(exit), u_R(status quo) > u_R(exit), u_L(status quo) + u_R(status quo) < u_L(exit) + u_R(exit).	Bargain	(n, n)	Cabinet termination
(IV)	u_L(status quo) < u_L(exit) , u_R(status quo) < u_R(exit)	$\max_{uL}$ {Bargain, Propose SQ}	(n, n)	Cabinet termination
(V)	u_L(status quo) > u_L(exit), u_R(status quo) < u_R(exit), u_L(status quo) + u_R(status quo) < u_L(exit) + u_R(exit).	Bargain	(n, n)	Cabinet termination
(VI)	u_L(status quo) > u_L(exit), u_R(status quo) < u_R(exit), u_L(status quo) + u_R(status quo) > u_L(exit) + u_R(exit).	Bargain	(y, y)	New policy (L's advantage)

Game 1

Table 3.2. Equilibrium payoffs for Game 1.

Sector	**(A, C) negotiation**
I	$V_A^t(\text{bargain}) = \left[G\lambda_A^o - \left(A - x_{SQ}\right)^2 + \nu_A \right](T-t) + \rho E[u_A^{t+1}](T-t-1)$ $V_B^t(\text{bargain}) = \left[-\left(B - x_{SQ}\right)^2 + \nu_B \right](T-t) + \rho E[u_B^{t+1}](T-t-1)$ $V_C^t(\text{bargain}) = \left[G\lambda_C^o - \left(C - x_{SQ}\right)^2 + \nu_C \right](T-t) + \rho E[u_C^{t+1}](T-t-1)$
II, VI	$V_A^t(\text{bargain}) = \left[G\lambda_A^o - \left(A - x_m\right)^2 + \nu_A \right](T-t) + \rho E[u_A^{t+1}](T-t-1)$ $V_B^t(\text{bargain}) = \left[-\left(B - x_m\right)^2 + \nu_B \right](T-t) + \rho E[u_B^{t+1}](T-t-1)$ $V_C^t(\text{bargain}) = \left[G\lambda_C^o - \left(C - x_m\right)^2 + \nu_C \right](T-t) + \rho E[u_C^{t+1}](T-t-1)$
III-V	$V_A^t(\text{exit}) = \left\{ \omega_A^{t+1} - \left(\frac{T-t}{T} \right) E[\Delta_A] \right\} T$ $V_B^t(\text{exit}) = \left\{ \omega_B^{t+1} + \alpha \left(\frac{T-t}{T} \right) E[\Delta_A] \right\} T$ $V_C^t(\text{exit}) = \left\{ \omega_C^{t+1} + \alpha \left(\frac{T-t}{T} \right) E[\Delta_A] \right\} T$

(continues)

In this game describes a situation in which A is the pivotal party. In this case A can unilaterally choose to either keeping the existing coalition alive, substituting it with a new cabinet, or calling a snap election. Her two possible interactions with B and C correspond to the bargaining subgame that I have solved above. Even though the two possible negotiations follow the same pattern, they generate different payoffs for the players: (A, B) bargaining follows the standars bargaining subgame; the (A, C) bargaining instead brings with it a new coalition and a redistribution of the office shares (in case a snap election is not called).

(continued)

Sector	(A, B) negotiation	
I	$V_A^t(\text{bargain}) = \left[G\lambda_A - \left(A - x_{SQ}\right)^2 + \nu_A\right](T-t) + \rho E[u_A^{t+1}](T-t-1)$ $V_B^t(\text{bargain}) = \left[G\lambda_B - \left(B - x_{SQ}\right)^2 + \nu_B\right](T-t) + \rho E[u_B^{t+1}](T-t-1)$ $V_C^t(\text{bargain}) = \left[-\left(C - x_{SQ}\right)^2 + \nu_C\right](T-t) + \rho E[u_C^{t+1}](T-t-1)$	
II, VI	$V_A^t(\text{bargain}) = \left[G\lambda_A - \left(A - x_{SQ}\right)^2 + \nu_A\right](T-t) + \rho E[u_A^{t+1}](T-t-1)$ $V_B^t(\text{bargain}) = \left[G\lambda_B - \left(B - x_m\right)^2 + \nu_B\right](T-t) + \rho E[u_B^{t+1}](T-t-1)$ $V_C^t(\text{bargain}) = \left[-\left(C - x_m\right)^2 + \nu_C\right](T-t) + \rho E[u_C^{t+1}](T-t-1)$	
III-V	If a* = exit	$V_A^t(\text{exit}) = \left\{\omega_A^{t+1} - \alpha\left(\frac{T-t}{T}\right)E[\Delta_A]\right\}$ $V_B^t(\text{exit}) = \left\{\omega_B^{t+1} + \alpha\left(\frac{T-t}{T}\right)E[\Delta_B]\right\}T$ $V_c^t(\text{exit}) = \left\{\omega_c^{t+1} + \alpha\left(\frac{T-t}{T}\right)E[\Delta_c]\right\}T$
	If a* = substitute	$V_A^t = \Gamma_A((A,C), \Lambda^o, x_{SQ}, \Theta^t)$ $V_B^t = \Gamma_B((A,C), \Lambda^o, x_{SQ}, \Theta^t)$ $V_C^t = \Gamma_C((A,C), \Lambda^o, x_{SQ}, \Theta^t)$

Since the game requires a backward induction solution, the payoffs of the (A, C) bargaining are first exposed in Table 3.2. In this particulare case, players A and B negotiate on a substitute cabinet, implying not just a new policy agreement, but also a modification of the offices shares vector. The (A, B) bargaining instead happens on the basis of the outcome of the (A, C) subgame. Player B chooses whether accepting the outcome of the negotiation with A, knowing that a refusal will put A in the condition to choose an optimal move a* by solving:

$$\max_{V_A}\{\text{exit}, \text{substitute}\},$$

that is, choosing between calling a snap election and starting a new subgame with C, for the substitution of the cabinet. A's choice influences the value of the exit option of the (A, B) bargaining.

A's first choice is then found by solving:

$$\max_{V_A}\{\text{bargain}, \text{substitute}, \text{exit},\}.$$

Game 2

In this case, the (B, C) bargaining follows exactly the same pattern as the (A, C) bargaining in Game 1; for this reason, the (B, C) payoffs don't need to be reported.

This game presents a peculiarity: the (A, B) subgame in this case differs from normal negotiations. Its exit option depends from what B will choose in the following nodes. B has two ways of refusing to make the bargaining fail: causing anticipated elections, or attempting to form a new cabinet with C. In case of a negotiation failure, B would choose an optimal move b* in the following way:

$$\max_{V_B}\{\text{reject}, \text{substitute}\}.$$

In an analogous way, A can choose whether calling a snap election or continuing her negotiation over public policies with B. Finding a* will solve:

$$\max_{V_A}\{\text{bargain},\text{exit}\}.$$

Table 3.3. Equilibrium payoffs for Game 2.

		(A, B) negotiation
I		$V_A^t(\text{bargain})=\left[G\lambda_A-\left(A-x_{SQ}\right)^2+\nu_A\right](T-t)+\rho E[u_A^{t+1}](T-t-1)$ $V_B^t(\text{bargain})=\left[G\lambda_B-\left(B-x_{SQ}\right)^2+\nu_B\right](T-t)+\rho E[u_B^{t+1}](T-t-1)$ $V_C^t(\text{bargain})=\left[-\left(C-x_{SQ}\right)^2+\nu_C\right](T-t)+\rho E[u_C^{t+1}](T-t-1)$
II, VI		$V_A^t(\text{bargain})=\left[G\lambda_A-\left(A-x_{SQ}\right)^2+\nu_A\right](T-t)+\rho E[u_A^{t+1}](T-t-1)$ $V_B^t(\text{bargain})=\left[G\lambda_B-\left(B-x_m\right)^2+\nu_B\right](T-t)+\rho E[u_B^{t+1}](T-t-1)$ $V_C^t(\text{bargain})=\left[-\left(C-x_m\right)^2+\nu_C\right](T-t)+\rho E[u_C^{t+1}](T-t-1)$
III-V	If b* = reject	$V_A^t(\text{exit})=\left\{\omega_A^{t+1}+\alpha\left(\frac{T-t}{T}\right)E[\Delta_B]\right\}T$ $V_B^t(\text{exit})=\left\{\omega_B^{t+1}-\left(\frac{T-t}{T}\right)E[\Delta_B]\right\}T$ $V_C^t(\text{exit})=\left\{\omega_C^{t+1}+\alpha\left(\frac{T-t}{T}\right)E[\Delta_B]\right\}T$
	If b* = substitute	$V_A^t=\Gamma_A((B,C),\Lambda^o,x_{SQ},\Theta^t)$ $V_B^t=\Gamma_B((B,C),\Lambda^o,x_{SQ},\Theta^t)$ $V_C^t=\Gamma_C((B,C),\Lambda^o,x_{SQ},\Theta^t)$

Game 3

Table 3.4. Equilibrium payoffs for Game 3.

	(B, C) negotiation
I	$V_A^t(\text{bargain}) = \left[-\left(A - x_{SQ}\right)^2 + \nu_A\right](T-t) + \rho E[u_A^{t+1}](T-t-1)$
	$V_B^t(\text{bargain}) = \left[G\lambda_B^o - \left(B - x_{SQ}\right)^2 + \nu_B\right](T-t) + \rho E[u_B^{t+1}](T-t-1)$
	$V_C^t(\text{bargain}) = \left[G\lambda_C^o - \left(C - x_{SQ}\right)^2 + \nu_C\right](T-t) + \rho E[u_C^{t+1}](T-t-1)$
II, VI	$V_A^t(\text{bargain}) = \left[-\left(A - x_m\right)^2 + \nu_A\right](T-t) + \rho E[u_A^{t+1}](T-t-1)$
	$V_B^t(\text{bargain}) = \left[G\lambda_B^o - \left(B - x_m\right)^2 + \nu_B\right](T-t) + \rho E[u_B^{t+1}](T-t-1)$
	$V_C^t(\text{bargain}) = \left[G\lambda_C^o - \left(C - x_m\right)^2 + \nu_C\right](T-t) + \rho E[u_C^{t+1}](T-t-1)$
III-V	$V_A^t(\text{exit}) = \left\{\omega_A^{t+1} + \alpha\left(\frac{T-t}{T}\right)E\left[\frac{\epsilon_B}{2(B-A)}\right]\right\}$
	$V_B^t(\text{exit}) = \left\{\omega_B^{t+1} - \left(\frac{T-t}{T}\right)E[\Delta_B]\right\}T$
	$V_A^t(\text{exit}) = \left\{\omega_A^{t+1} + \alpha\left(\frac{T-t}{T}\right)E\left[\frac{\epsilon_B}{2(A-B)}\right]\right\}$

This game is very similar to Game 2; the payoffs produced by the (A, B) and (B, C) bargaining subgames are identical and will not be repeated.

The difference is an additional, lower branch that is not present in Game 2. It represents A's option of opening a government crisis; B can choose between causing a snap election, and thus paying the valence cost for the opportunistic action, and attempting to form a new cabinet with C. In this last case the valence cost will be payed by A, who caused the cabinet crisis in first place.

The lower subgame can thus be solved backwardly:

$$\max_{V_B}\{\text{substitute}, \text{exit}\}$$

and

$$\max_{V_A} \{\text{bargain}, \text{exit}\}$$

In the next section, I will subject the fundamental predictions of the present theoretical model to empirical testing.

Empirical Test

At the beginning of the legislature, a policy agreement is found among coalition parties, which can be assumed to be stable for at least two reasons. First, the post-electoral negotiations on the formation of the cabinet and its policy agreement are based on the bargaining weights of each of the parties involved, that depend from the distribution of electoral support for the parties; it is a long and complex bargaining game, and parties would unlikely want to break an agreement they just approved. Second, as the evidence provided in the previous chapter suggests, breaking a cabinet in the early stages of the legislature might represent a significant popularity cost for the incumbent that is responsible of the termination. What are the conditions that, at some point during the legislature, make a cabinet termination more likely? The answer can be found by looking at the incumbent parties' exit option, i.e.: their distribution of electoral advantages and disadvantages.

The bargaining subgame that was solved in Table 3.1 is based on a fundamental assumption: the outcome in a bargaining game on public policies among government parties depends from their

electoral expectations. It seems thus possible to describe the probability of a cabinet termination by looking at voting forecasts provided by voting intention opinion polls. In the formal terms of the model exposed herein: the more an exit option moves from the conditions that made a cabinet possible (Sector I), and as more time passes, the more likely will be that at least one of the incumbent parties will find a cabinet termination advantageous, or that the bargaining game will fail (Sectors III-V). It seem then reasonable to assume that turbulence in government parties' popularity is a proxy for the conditions that are more likely to lead to an anticipated cabinet termination. In other words, the stronger turbulence in governing parties' popularity is, the more it is likely that some incumbent will be interested in calling a snap election, and the more costly will be to find an alternative policy compromise that is acceptable for all. Recalling the insights form the introduction of this chapter, a party might want to terminate a cabinet for a number of reasons, such as forecasts of bad future performances, that might lead an incumbent to terminate the cabinet in order to "not loose too much", or peaks of popularity, that bring a party to choose to take electoral gains from an advantageous temporary situation before it's too late [Smith 2004]. In all of these cases, it can be legitimately assumed that a significant shift of the exit option form the initial conditions of the legislature can alter the players' preferences on the survival of the government.

The first, main prediction that can be tested in order to control the validity of my model is the following:

> (H3.1) A higher turbulence in the distribution of electoral advantages and/or disadvantages among the members of a governing coalition is associated with a higher likelihood of cabinet termination.

A second hypothesis is meant to establish a connection with the empirical findings of the previous chapter. As it was shown, an incumbent party will be more likely to call an early election the more

her competing candidates are ideologically distant. In other words, when there are no candidates that are ideologically similar to any incumbent, then the majority of voters that have been disappointed by the opportunistic cabinet termination will not be able to punish them with their vote. In this case, the hypothesis can be stated as:

> (H3.2) A higher ideological dispersion of the legislature will be associated with a higher probability of cabinet termination.

On the basis of the empirical findings of Chapter 2, a legislature that is ideologically more dispersed will produce, on average, cabinets that are less costly (in terms of popularity) to tear down.

A third hypothesis can be deduced from my model by recalling the difference in the structure of the three games above. If a Head of the State has strong dissolution powers, that by definition are subtracted to the prime minister or the cabinet, then it will be harder, for opportunistic incumbents, to time general elections whenever they want. In more formal terms:

> (H3.3) The presence of a partisan Head of the State, provided with strong dissolution powers, will lower the likelihood of cabinet termination.

When prime ministers, or government parties more generally, are not completely free in timing general elections, they would anticipate the stabilizing role of the Head of the State, whose purpose is to guarantee political stability and to concede an early election only when inevitable.

The test of H3.1 requires a measure of the turbulence in government parties' popularity, i.e.: a measure of the variation in the distribution of advantages and disadvantages changes with respect to the conditions that brought the cabinet into existence. In order to do this, I needed a measure based on series of voting intention polls, showing how parties' popularity changes through time. The

value of a measure based opinion polls is especially intuitive given that they probably represent the same tool that actual government leaders use on a daily basis in order to check their popularity levels.

I resorted to a rough but effective measure based on the opinion polls gathered. I assume that the variation in a party's popularity from the initial bargaining conditions can capture the variation in its respective exit option, helping us predicting the probability of a cabinet termination. I thus created a time-varying variable estimating the *change of an incumbent's exit option*, defined as the sum of the deviations of the parties' vote shares predicted by opinion polls, from their actual vote shares they received at the last election. The unit of analysis of my empirical test is thus the incument party, from a consensual coalition cabinet. Data on elections and parties' vote shares have been taken from the ParlGov online database. Following these insights, I collected opinion polls corresponding to questions such as: "If an election were held today, for what party would you vote for?", from four countries: Austria (1999-2012), Denmark (1999-2012), Italy (2008-2016), and the Netherlands (2002-2016), for a total of fifty-four years of parliamentary politics. Sources by country are reported in Appendix C. The raw dataset counted almost 2,500 opinion polls. I have taken the weekly averages of these serie, using Thursday (the middle of the week) as the modal category in order to uniform the trends. Excluding caretaker cabinets, my final dataset covers a total of fifty-six coalition parties suitable for the test.

This popularity change variable can be thought as a crude measure of how the distribution of advantages and disadvantages among the coalition partners shifts. The more the parties' exit option changes with respect to the initial conditions that made a government agreement possible, the higher the likelihood of cabinet termination. An incumbent party leader might choose to cause a cabinet termination for more than one reason: forecasting an electoral gain, preventing a further popularity loss, or because of a bargaining failure; all of these cases should correspond to comparatively higher levels of the main variable. It is important to outline the additive nature of this

measure: the more numerous the coalition, the higher its value will be on average. It seems reasonable to assume that coalitions composed of several parties are comparatively more likely to end prematurely; the variable is designed to capture this.

However, the value that the exit option represents for a government party can be understood only with reference to the termiation value for other coalition partners. For this reason, I paired the first variable with a second one, called *change of other incumbents' exit option*, representing an aggregate measure of the alteration in the exit option for the remaining incumbents. As for the first variable, I expect an increase in the turbulence in popularity for the remaining part of the cabinet to be associated with a greater probability of cabinet termination.

Notwithstanding the low correlation between the two variables capturing the parties' popularity change is rather low (Spearman's rho: 0.243), the two measures are very close from a theoretical point of view. A higher turbulence in a cabinet's popularity shall be captured by both the variables. For this reason, an interaction term between the two was included in the test. This allows to observe the independent impact of the two variables.

The *ideological dispersion around the government median point* was introduced in order to test H3.2, a fundamental prediction that constitutes the pillar of my valence theory. This measure is weighted for each party's vote share, in order to control for the voters' ideological distribution. As in the previous chapter, the data on ideological scores have been taken from the "*rile*" index, from the Manifesto Policy Dataset. In this way, I got an estimation of the ideological dispersion around the heart of the coalition that supports the government. With this variable I expect to capture the effects of the valence cost on the choice of terminating the coalition: the more parties are ideologically cohesive around the coalition government's median point, the more costly will be to opportunistically terminate the cabinet. On the basis of my valence theory and the empirical findings offered by the previous chapter, I expect that more ideologically dispersed legislatures will offer less voting alternatives for deluded voter, reducing the incumbents' cost of ending the

government ahead of time.

The proximity measure employed in the previous chapter cannot be employed here, for the following reason: the ideological position of parties is varying greatly through time, and from election to election. The ideological proximity variable, as defined in Chapter 2, is a static measure, and very sensitive to shifts in ideological distances at the same time. The main variable of the previous empirical test cannot thus be emlpoyed.

In order to test H3.3, I have introduced a dummy variable that is meant to control for the presence of an *elected Head of the State*, since I assume this feature to lower the risk of cabinet termination. Among the countries represented in my dataset, Denmark and the Netherlands show a non-elected Head of the State, either a king or a queen. In modern parliamentary democracies, monarchs are purely representative figures, devoid of any real political power; dissolution powers are all in the hands of the government. In Austra and Italy, instead, the Head of the State is elected (by citizens and by the parliament, respectively) and is provided with actual dissolution powers. For government leaders, the lack of complete dissolution powers should work as a constraint on their opportunistic actions; for this reason, I expect this variable to show a negative association with the risk of cabinet termination.

I have then introduced a set of intervening variables, capturing either some features of the bargaining environment, and institutional effects. The first is the *number of government parties*, taken from the ParlGov online database. This choice is based on the obvious assumption that the probability of a bargaining failure is positively associated with the number of players. I expect this variable to capture effectively the complexity of the negotiation. A second covariate is meant to control for the rules that charachterize the decision making process in the coalition. There are countries, such as Denmark, in which the prime minister has the power to unilaterally impose her choices on other cabinet members, while in other systems, such as Austria and Italy, in which unanimity is required for making decisions. For this reason, I introduced a slightly modified version

of the unanimity variable from the Comparative Parliamentary Democracy (CPD) Data Archive [Strom et al. 2008]: I coded the former as 0, and the latter cases as 2. The Netherlands represent an intermediate case, on the basis of what Timmermans and Andeweg [2000] reported:

> The standing orders of the council of ministers provide most of the rules that apply during the lifetime of a cabinet. It spells out the voting procedures: by ordinary majority of all ministers present; a second vote in case of a tie and if the tie remains unbroken, the prime minister casts the deciding vote [:381].

Given this peculiar feature, I coded the Netherlands as 1. I assume unanimity rule to affect the coalition bargaining game, making it more costly to find an agreement on public policies and raising the probability of a bargaining failure. Consequently, I expect the unanimity variable to be positively associated with the risk of cabinet termination.

Another important variable controls for the presence of an *investiture vote* for the government. In some countries, such as Austria and Denmark, charachterized by negative parliamentarism, the government doesn't need a parliamentary investiture vote to be in charge. In other systems instead, such as Italy, the government cannot start the works without the explicit support of a parliamentary majority. This difference is of fundamental importance: the requirement of a legislative investiture is a hurdle that should diminish averaged uration by causing some governments to fail very quickly [King et al. 1990:857]. I have thus coded those countries in which there is no investiture vote for governments as 0 (Austria and Denmark), and those countries in which a parliamentary majority is needed as 1 (Italy and the Netherlands). This, once again, requires an important specification for the Netherlands; following Bergman [1993]:

> In the Netherlands, there is a strong norm (a concept that is broader than the more precise term 'practice') that the preferable outcome of government formation is a majority government. [...] It is

> not required that there must be a vote of investiture before a government assumes power. On the other hand, the norm that the government should be supported (and not just tolerated) by the parliament is very strong [:57-58].

I expect this variable to be negatively associated with the risk of cabinet termination. If government leaders are sure from the start to enjoy a clear parliamentary majority, then their coalition will be comparatively less likely to terminate ahead of time. Analogously, if, in order to substitute the current cabinet with an alternative one supported by a different coalition, the government needs to pass through an investiture vote by the parliaments, then the options available for an opportunistic incumbent that wants to terminate the cabinet will be lower. I thus expect a negative sign for *investiture vote*.

I have then introduced two dummy variables in order to control for the coalition type, one for *minority* governments, the other for *oversized* coalitions. I both cases, I expect that deviations from the minimum winning status to raise the risk of cabinet termination.

The statistical model employed is a semiparametric survival regression. This model is especially useful, since it allows me to avoid making unnecessary assumptions on the baseline hazard of cabinet termination [Box-Steffensmeier and Zorn 2001; Box-Steffensmeier and Jones 2004]. Given the variable nature of popularity trends, any commonly used probability distribution might not descrive them efficaciously; semiparametric models allow for a flexibility that other models cannot grant. Moreover, as it will be shown below, Cox regression outperforms all the main parametric models.

For this empirical test, I started treating any early cabinet interruption as termination event, either those that lead to the formation of a new, alternative coalition from the same legislature, and those that caused the call of an early election. I referred to Parline, the Inter Parliamentary Union online database on national parliaments, in order to attribute the responsibility of each government crisis to the right incumbents. The observations relative to the parties that didn't appear as

responsible of the cabinet termination have been treated as censored observations.

Such a test is perfectly in line with the predictions of my formal model: for a government party, the exit option of a bargaining game can be represented by either a government substitution, or by the value represented by an anticipated election. The measure of turbulence can predict the two events altogether. This is due to the fact that the value of both the options is, at least in part, based on the electoral expectations of the players. Either in the more obvious case of a snap election, and in the case of a negotiation over the formation a substitute coalition, the game is played by looking at the players' electoral expectations, that determine who wins and who loses. Subsequently, I repeated the same analysis looking at the early election and cabinet substitution events, separately. When a government reaches the end of the legislature, the observation is right censored. The censoring also happens in those more obvious cases in which the opinion polls series is interrupted before the end of the cabinet could be empirically observed.

The main results are shown in Table 3.5.[23] The first couple of empirical model represents an explanation of the probability of a cabinet termination, either caused by early election calls and cabinet substitutions.

The estimates of *changes in the exit option* of incumbents' popularity showed the expected signs. The probability of cabinet termination is higher when the disproportion of electoral advantages and/or disadvantages changes with respect with the initial conditions. Consequently, it can be assumed that strong variations in the parties' exit option correspond to a higher probability of a failure in the negotiation. H3.1 is thus confirmed.

23 Because of the almost perfect multicollinearity between institutional variables and country-fixed effects, I excluded the latter from the test. The same analyses with country-dummy variables are available in Appendix E.

Table 3.5. Cox proportional hazards models of cabinet duration.

	Pooled	
	Model 3.1	Model 3.2
Bargaining environment		
Changes in the exit option (party)	0.290 *** (0.097)	0.415 *** (0.117)
Changes in the exit option (others)	0.161 ** (0.076)	0.191 ** (0.076)
Change (party) × Change (others)	–0.015 * (0.009)	–0.029 ** (0.012)
Number of government parties	3.236 *** (1.062)	2.342 (1.554)
Ideological dispersion (coalition)	0.308 *** (0.080)	1.306 *** (0.238)
Ideological dispersion (legislature)		–1.249 *** (0.296)
Minority	5.757 *** (1.130)	1.115 (1.594)
Oversized	–4.238 * (2.229)	–2.109 (2.725)
Institutional effects		
Unanimity	15.418 *** (3.793)	9.542 * (4.942)
Elected Head of the State	–22.793 *** (6.264)	–15.933 * (8.151)
Investiture vote	–10.531 *** (3.274)	–7.683 * (4.643)
R^2		
N	3290	3290

* p < 0.1. ** p < 0.05. *** p < 0.01.

(continues)

The *ideological dispersion around the government median point* played a crucial role too. Its positive impact on the risk of cabinet termination confirms the fundamental prediction of my valence theory, for which an incumbent's popularity cost of cabinet termination raises together with its ideological proximity with other competitors. This parameter represents an additional

confirmation of the empirical tests from Chapter 2. Additional confirmation came from the addition of the *ideological dispersion of the legislature*, that allowed to control for other potential effects that such a variable can capture. The impact of the ideological dispersion arount the government median point is still clear and extremely significant.

(continued)

	Early elections		Cabinet substitutions	
	Model 3.3	Model 3.4	Model 3.5	Model 3.6
Bargaining environment				
Changes in the exit option (party)	0.352 ***	0.448 ***	0.086	0.133
	(0.128)	(0.166)	(0.248)	(0.254)
Changes in the exit option (others)	0.277 ***	0.304 ***	–0.410 *	–0.399 *
	(0.098)	(0.104)	(0.223)	(0.220)
Change (party) × Change (others)	–0.014	–0.027 *	–0.040	–0.044
	(0.011)	(0.016)	(0.034)	(0.035)
Number of government parties	7.833 ***	8.202 ***	–12.488	–15.416
	(1.865)	(3.015)	(14544.914)	(14852.275)
Ideological dispersion (coalition)	0.823 ***	2.265 ***	0.172	–0.989
	(0.170)	(0.384)	(0.153)	(1.305)
Ideological dispersion (legislature)		–1.442 ***		1.006
		(0.312)		(1.549)
Minority	13.373 ***	10.824 ***	–14.946	–12.949
	(2.505)	(3.015)	(42941.326)	(40.227.991)
Oversized	–31.147	–34.863	3.391	33.621
	(5163.445)	(8692.987)	(23146.321)	(20785.684)
Institutional effects				
Unanimity	36.189 ***	37.843 ***	–43.129	–46.634
	(7.825)	(9.752)	(66527.429)	(64694.355)
Elected Head of the State	–50.597 ***	–53.589 ***	66.887	79.370
	(11.644)	(14.572)	(110329.952)	(109035.987)
Investiture vote	–20.116 ***	–18.697 ***	15.328	22.568
	(4.933)	(6.427)	(49393.665)	(49166.795)
R^2				
N	3290	3290	3290	3290

* p < 0.1. ** p < 0.05. *** p < 0.01.

The *Head of the State* coefficient corroborates H3.2: if the Head of the State is not a monarch (as in the case of Denmark and the Netherlands), but is an elected politician with actual political powers (as in Austria and Italy), then the probability of cabinet termination is significantly lower. This suggests that when dissolution powers are in the hands of the Head of the State, government leaders will not be completely free of timing the end of the government.

The *number of government parties* show a strong positive association. Its sign, probably the most unsurprising among all coefficients, confirms the naive prediction that a negotiation between several parties is comparatively more likely to fail.

The *unanimity* coefficient captured the "rigidity" in of the decision-making process, telling us that the more coalition parties parties are subject to bargaining constraints, the harder will be to find a point of agreement among them. This result is also in line with the most classic works of public choice theory [Buchanan 1962].

The negative sign of *investiture vote* confirms us that governments that need explicit parliamentary support are comparatively more enduring than their counterparts. Investiture vote can also be legitimately assumed to reduce the number of viable coalitions that can be substituted to the current, reducing the number of options of an opportunistic incumbent.

Finally, *minority* governments are confirmed to increase the likelihood of cabinet termination, even while controlling for the Denmark fixed effect. This is hardly surprising, given that minority governments are by nature more "fragile" than their minimum winning counterparts. On the contrary, the dummy for *oversized* did not show the expected results. This might be due to the scarcity of such cases: in the whole dataset, only one cabinet (the Italian Letta I) was supported by an oversized coalition.

The same analysis has been then repeated considering, as termination events, an early election call and a cabinet substitution, separately. Results are shown in Table 3.6. Model 3.3 and 3.4, reporting the results for early election events, confirm all the hypotheses formulated above.

Cabinet substitution models, instead, didn't fulfil expectations. This is probably due to the small number of such cases, only five in the dataset. However, the main empirical predictions of my model result corroborated.

Additionally, Table 3.6 shows how the semiparmetric Cox model, allowing to abstain from making parametric assumptions on the baseline hazard of event occurrence performed better than its common parametric counterparts.

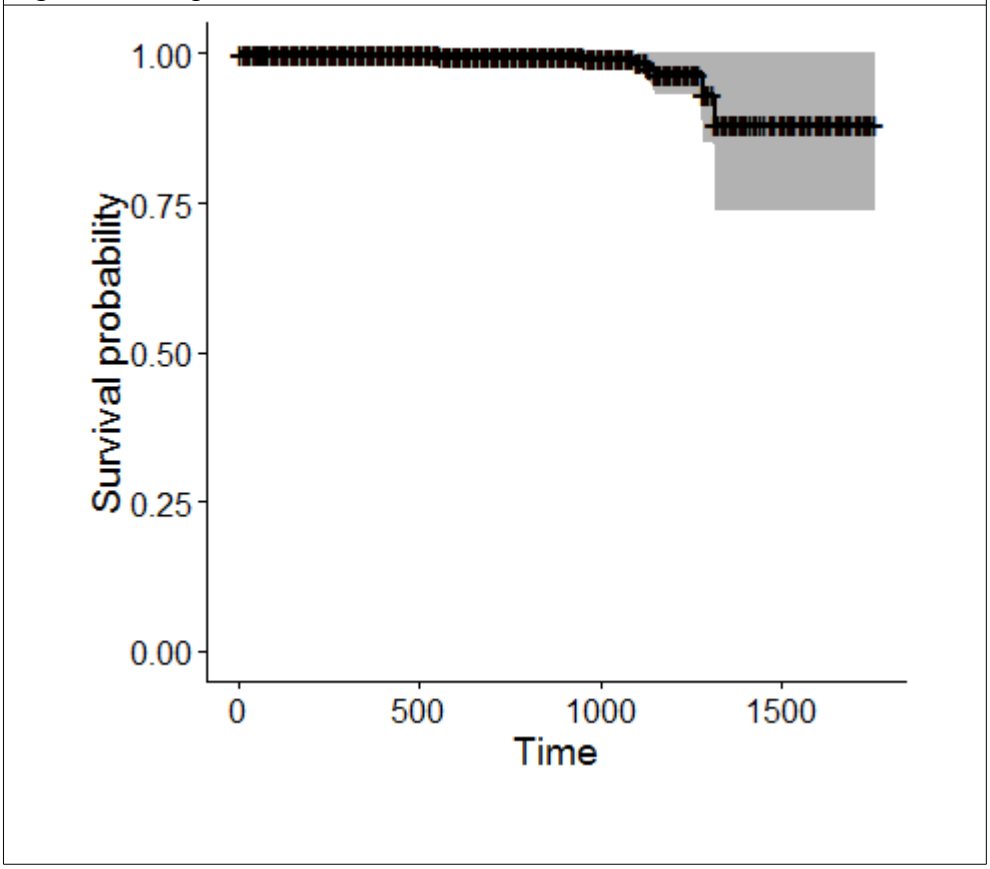
Table 3.6. Goodness of fit tests for semiparametric and parametric models.

Models	Log-likelihood	BIC	AIC
Cox (Model 3.1)	–125.5289	332.0442	271.0577
Weibull	–246.1519	581.3888	516.3037
Exponential	–253.8798	596.8447	529.7596
Log-normal	–251.5099	592.105	527.0199

However, it can be argued that from my model, especially by looking at Figure 3.5, it must be concluded that the risk of cabinet termination grows as parties come closer to the end of the legislature, an assumption that was not embedded in a Cox semiparametric regression. In fact, the raising hazards of cabinet termination can be graphically observed by looking at Figure 3.9. It thus seems clear that the probability of cabinet survival lowers as time goes, but that the most common parametric event history models cannot describe this phenomenon in a satisfactory way.

The results achieved thus confirm the theoretical and empirical robustness of my formal bargaining model and, more generally, of my valence theory of election timing.

Figure 3.9. Kaplan-Meier estimates of Model 3.1.



Conclusions

The purpose of this chapter was to develop a formal theory of cabinet termination in multiparty, consesual democracies, and to test its implication.

Throughout a legislature, coalition parties in a consensual parliamentary sistem are involved in a continuous bargainig on public policies. In every moment, an incumbent chooses between keeping the cabinet alive, together with the negotiation with other coalition partners, and withdrawing from the cabinet. This second choice can lead either to the substitution of the current coalition with an alternative from the same legislature, or to an early election. The value that a

cabinet termination represents for the parties can be described as the exit option of a non-cooperative bargaining game. In such a game, electorally advantaged coalition partners can exploit their position in order to obtain policy benefits from more disadvantaged incumbents. This puts my model in line with the past formal literature on election timing [Lupia and Strom 1995; Diermeier and Stevenson 2000]. These election timing prerogatives, however, come with a cost that can be described as a negative shock in the valence capital of the incumbent causing the cabinet termination. This assumption constitutes the pillar of my valence theory of election timing that was exposed in Chapter 2 and developed in my formal model.

The bargaining subgame exposed above can explain how the exit option determines what policies are acceptable and what aren't for the government parties involved. It allowed also to explain why in some cases both parties have interest in keeping the status quo policy intact, while in others a new negotiation on public policies happens, and when this negotation is doomed to failure instead. That simple model, combined with the effects of time, described by a series of discrete steps, describes why the same exit option can produces opposite effects in different periods of the legislature. The inclusion of temporal effects of on coalition negotiation, unprecedented in the formal literature of consensual models, was made possible thanks to the quasi-recursive structure of players' utility, as taken from Kayser [2005].

I then deduced a set of predictions that have been subject to empirical testing using event history methodology. The results confirmed what expected. High variations in the exit option of coalition parties' bargaining on public policies lead to a disequilibrium in the distribution of electoral advantages and/or disadvantages, changing the conditions that made an initial coalition agreement possible, and raising the probability of a negotiation failure. The outcome of the coalition bargaining game is influenced by several factors, either due to the nature of the bargaining interaction, and to institutional features that change from country to country. An ideologically spread legislature provides deluded voters with a comparatively lower number of alternatives,

making harder for them to punish opportunistic incumbents. My valence theory of election timing received additional empirical confirmation. The assumption of opportunistic, of self-interested party leaders is made cleare by looking at the dissolution powers of the Head of the State: when dissolution powers are subtracted to the arbitrariness of the prime minister or the incumbents, cabinets tend, all things equal, to last longer. Moreover, the coalition is more likely to terminate ahead of time time stronger are the constraints to the incumbent's bargaining. When unanimity is required among government officials, the excessive rigidity of the game lowers the survival probability of the government. Analogously, the requirement of an investiture, by making parliamentary support explicit, raises the survival probability of the cabinet, and lowers the number of potential coalition that an opportunistic incumbent might try to substitute to the current one.

I believe the theoretical insights provided, supported by the empirical evidence, brings a set of improvements for the literature on election timing. This model of election timing was able to put together different branches of political science that had never been linked before: it introduced the role of valence issues in election timing and, more generally, made election timing compatible with spatial models of policymaking. Finally, it is the first formal model in the consensual family providing an adequate description of the effect of time on incumbent parties' choices, showing how the same popularity shock in different can lead to completely different outcomes in different times of the legislature.

The empirical side of the present study provided some advancements too: it is the first empirical test in political science that used time-varying data on voting intentions. Using data on parties' popularity trends in order to explain the likelihood of cabinet termination, though intuitive, had never been done before in the literature on election timing.

The empirical test I showed represented an additional confirmation of my valence theory of election timing. Moreover, it was done using a set of countries that is partially different from the ones employed in the previous chapter. I argue that empirical corroboration coming from two very

different datasets make my results even more robust.

Chapter 4

Coalition bargaining and Ministerial Tenure. A Corollary Analysis.

The purpose of this chapter is to explain how the bargaining theory reported in Chapter 3 can be applied, with few corollary assumptions, to the study of ministerial tenure. The bargaining subgame, as depicted in Figure 3.5, is based on the fundamental concept of exit option, i.e. the value that a negotiation failure represents for the parties involved. It was showed how an electorally disadvantaged party could be forced to grant non-electoral benefits to a more advantaged coalitoin partner, in order to avoid an anticipated cabinet termination. In the previous chapter, these non-electoral benefits have been described as policy concessions. Public policies, however, do not exhaust the set of possible benefits that an electorally advantaged party can extort from other coalition parties. It can also be assumed that the layoff of single ministers, or alterations of their policy prerogatives, can be thought as an exchange currency in power relations among government parties. A very unpopular incumbent, in fact, might be forced to have a minister removed from his or her office, and excluded from the cabinet or transferred to a less relevant ministry. Analogously, an electorally advantaged party can reasonable expect to obtain an increase in the policy prerogatives for its ministers. Moreover, it seems reasonable to assume that ministers that belong to popular parties are more "protected" from potential popularity shock. A comparatively weaker party could be forced by other coalition parties to the minister hit by a scandal.[24]

24 It is however important to note that the purpose of the present chapter is not estimating the magnitude of

The studies focusing directly on the duration of ministerial spells, based on event history methodology, are not many. Berlinski et al. [2007] also highlighted the lack of quantitative studies in this field. They analyzed ministerial tenure in the United Kingdom employing a series of variables capturing features at both the individual and governmental level. It results that British ministers are more safe from dismissal when they have higher education,[25] when they are younger, and when they have a longer experience. Predictably, ministers of the highest ranks are more stable, since the dismissal of a very relevant would be a cause of greater turmoil within the incumbent party. It also appears that women's careers are more stable than men's. In a later research [2010], Berlinski et al. broadened the enquiry recurring to the occurrence of resignation calls from the main British newspapers as an explanatory variable of ministerial tenure, finding that resignation calls increase the probability of dismissal. An interesting, less obvious finding is that responsibility seems to be distributed among all the members of the cabinet: a resignation call for one minister seems to influence the duration of other ministers' tenure.

The only important comparative work that takes into exam the duration of ministerial spells is offered by Huber and Martinez-Gallardo [2008]. They produced a broad research on ministerial duration, employing data from nineteen countries, either Westminster and consensuals. They analyzed the occurrence of different events: the dismissal of a minister throughout the legislature; the dismissal of a minister at a cabinet termination; the termination of the cabinet and the survival of the minister. Since their dataset presents a much greater institutional and governmental variety, these effects must be controlled for. It results that ministers are more stable in coalition governments, when they belong to larger parties, when they control an important portfolio, and when the legislature is charachterized by a lower electoral volatility.

Another stream of research investigates the occurrence of cabinet reshuffles in Westminster

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the corrective effect of a ministerial resignation, following a popularity shock. For this topic, see Dewan and Dowding [2005], Dewan and Myatt [2007], Berlinski et al. [2010].

25 In case of the United Kingdom, the most predictive educational variable captures "Oxbridge" education.

political systems. Kam and Indridason [2005] defined reshuffles as "any change in ministerial personnel or responsibilities that affects more than two portfolios" [:329]. Contemporaneous changes in ministerial prerogatives are, as they argue, non-independent events; the dismissal of single ministers is thus off-topic. Reshuffles in majoritarian systems are explained as a tool that prime ministers use in order to maintain power by getting rid of potential intra-party competitors and increasing the chances of winning the elections. When the prime minister's leadership becomes more precarious, reshuffles become more likely. The risk of cabinet reshuffles is higher when the prime minister has limited dismissal powers, when the prime minister's popularity declines, and when the popularity gap between the prime minister's party and other coalition partners shrinks, putting coalition partners in a stronger bargaining position. A later research [Indridason and Kam 2008] offered one of the very few formal models in the literature, showing how cabinet reshuffles represent an efficient mechanism for reducing the moral hazard facing ministers.

Other works, more distant from the object of the present chapter, tried to explain the probability, for elected politicians, to be selected as ministers by party leaders [Kerby 2009, 2011; Kam et al. 2010; Back et al. 2016].

All of the researches produced up to now on ministerial tenure share two main limitations. First, their general lack of interest for multiparty, consensual systems: amost any effort was concentrated on Westminster systems, with an outstanding dominance of the United Kingdom. Second, all the duration models employed up to now are essentially static tests: they are based on a collection of data on individual, party, government and polity features. This is analgous to the status of the literature on election timing, as reviewed in Chapter 1.

The research on ministerial careers lacks also a treatment of the effects of coalition bargaining in multiparty consensual systems, and how the threat of an anticipated cabinet termination can be exploited by electorally advantaged parties in order to rip-off office and policy andvantages has never been analyzed. Additionally, ministerial duration has never been explained

using time-varying voting intentions data. The bargaining model exposed in the previous chapter offers the opportunity to fill this gap. Its insights will be employed for a corollary inquiry on the determinants of ministerial tenure, and will produce novel, untested assumptions.

Testing the Bargaining Model on Ministerial Tenure

The fundamental hypotheses of the presente chapter can be deduced starting from two main assumptions: first, electorally advantaged coalition parties can extort non-electoral benefits from other coalition parties; second, the resignation of a minister, or an alteration of his or her prerogatives, can be thought as an exchange currency in coalition power relations. This leads to the two following hypotheses:

> (H4.1) A higher turbulence in the distribution of electoral advantages and/or disadvantages among the members of a governing coalition is associated with a higher likelihood of ministerial termination.

> (H4.2) A higher turbulence in the distribution of electoral advantages and/or disadvantages among the members of a governing coalition is associated with a higher probability of a reallocation of ministerial prerogatives.

These hypotheses can be easily tested with tools similar to the ones employed in the previous chapter.

As a starting point for the empirical test, I collected data on 453 ministers from all the cabinets analyzed in Chapter 3. These data have then be combined with the relative voting intention trends. I thus obtained a large dataset, counting almost 20,000 observations. As in the previous chapter, I will employ a Cox proportional hazard model, that allows to avoid making assumptions on the baseline hazard of ministerial tenure. Event history methodology, however, requires a clear definition of the event that causes the termination of a ministerial office. I will run two separate tests, based on two different kind of "events". The first is *ministerial termination*, occurring every time a minister is removed from office, and no other role is provided untile the termination of the cabinet. This is the most obvious definition of event for such a methodology, and the basis of some of the most relevant empirical works [Berlinski et al. 2007, 2010; Huber and Martinez-Gallardo 2008]. The second class of events is labeled *power redistribution*, and encompasses more than one case: the termination of a minister, as in the first case; a ministerial reshuffle, in case a minister is shifted from one ministry to another; an alteration of the policy prerogatives of that minister. This second definition of event is thus broader, and includes the first. No such events leaves incumbent parties indifferent: each of these cases counts as a redistribution of power among government leaders.

When the whole cabinet ends, because of an election or the substitution of the old cabinet with a newer one, all the observations are trated as censored. This requires a specification: the goal of the present research is the check whether a change in government parties' electoral expectations can successfully explain the length of ministerial tenure. The birth of a new cabinet, following an election or the termination of a previous coalition, is a crucial moment for parliamentary politics that can determine the career of a minister, but it represents a phenomenon that does not constitute the point of the present research. For this reason, the removal of a minister, or the alteration of his or her policy prerogatives at the moment of the birth of a new government are not to be explained.
The unit of analysis is the single minister-cabinet. For this reason, if an individual owns more than

one ministerial prerogative, the observation will not be split into two distinct observations, but treated as one.[26]

The following variables will be included in the test. The main predictor is, once again, the *change in the party's exit option*, as operationalized in Chapter 3, to which the *change in the exit option of other coalition parties* is associated in order to control for the disequilibrium in the electoral expectations of the coalition as a whole.[27] This second variable is of fundamental importance, given that the negotiation between government parties is a collective phenomenon, that cannot be studied by analyzing a single incumbents separately. The value of the exit option for a government party can be understood only with reference to the value it represents for other coalition partners. As in the previous chaper, and on the basis of the insights provided above, I expect the two *change* variables to be positively associated to the probability of event occurrence.[28]

Together with these two variables, I included a series of covariates. The *prime minister's dismissal powers* is a dummy variable that takes the value of 1 in case a prime minister has the

26 The alternative strategy would require a different unit of analysis: ministry-cabinet, or policy field-cabinet. I argue this would make the test much harder and controverse: first, it would hadrly describe the sum of policymaking power in the hands of a single minister holding more than one office; second, the distinguishing between different policy fields is not as easy as it might seem at first sight.

27 This methodology brings one inconvenient: the introduction of the *change* variables exclude, by definition, independent ministers from the test. However, I argue this represents a just a minor drawback, given that independents account for about two percent of the ministers in the dataset.

28 The same explanatory variables employed in Chapter 3 are used for the present empirical tests. Turbulence in the exit option of coalition parties leads to a reallocation of ministerial powers, and, beyond a certain threshold, to a cabinet termination. In light of this, one might hypothesize a non-linear association between the main predictor and the probability of event occurrence. However, because of the methodology employed in the present Chapter, this is not to be expected: minister-cabinet observations are censored at the time of a cabinet termination. This ruled out the threshold values of the change variable beyond which a termination of the cabinet is to be expected, instead of its ministers.

power to remove ministers [Bergman et al. 2003:186-187; Strom et al. 2003]. This variable is thus coded as 0 for Italy and the Netherlands, and 1 for Denmark and Austria. It seems reasonable to expect a positive association between this variable and the probability of event occurrence: if the prime minister has this power, then it will be much easier to remove an "uncomfortable" minister.

The *number of government parties* is meant to control for government heterogeneity. A measure of ideological range based on the Manifesto Policy Dataset was ruled out because of its very high correlation with other variables.

The *number of events* happened in the cabinet is included, given the assumption that cabinet members cannot remove or redistribute ministerial power indefinitely. A coalition can bear a certain amount of internal turbulence, beyond which parties would opt for a cabinet failure. For this reason, I assume a negative association between this variable and the event hazard.

A *postelection* dummy is included on the basis of the following considerations: given that possible governing coalitions are finite in any given legislature, the postelection status of a cabinet provides incumbents with more potential alternative coalition that can be substituted to the current one in case a government crisis happens. A cabinet devoid of this tool might recur to the demotion of a minister, or to a redistribution of ministerial powers, in order to face the crisis. Consequently, ministerial tenures should be longer during postelection governments.

A couple of coalition variables, controlling for *minority* and *oversized* cabinets, are included. I assume that deviations from the minimum winning status make cabinets more unstable, and lower the survival probability of single ministers. A greater number of corrective measures, by incumbent leaders, might be needed in order to keep the cabinet alive as long as possible. I thus expect a positive association between these two coalition dummies and the probability of event occurrence.
The variables listed thus far are relative to the bargaining environment in which coalition parties play their bargaining game. They capture institutional, governmental, and party-level effects, and are meant to capture those factors that are not attributable to single ministers. A second set of

variables capture the most relevant individual-level features.

The first is a dummy, controlling for the *prime minister's party*. I assume that a minister that belongs to the same party of the prime minister enjoys a more priviledged status that their counterparts. The grater negotiation power of a prime minister should represent a greater protection for his or her career.

The *relevance of the portfolio* held by the minister is of fundamental importance. Information on portfolio relevance was taken from Druckman and Warwick [2005], that constitutes the source of relevance scores that is temporally closer to the observations at hand. When a minister controls more that one policy field, the values of the respectiv portfolios have been summed. A negative association with the probability of ministerial termination is expected, assuming that the removal of a low rank minister has a moderate effect on the coalition equilibrium.

Age of the minister is a continuous variable, estimating the number of years of life of the minister. This variable is computed confronting the birth date of each minister with the dates that compose the voting intention trends. For this reason, the ministers of the present dataset grow older as time passes. *Gender* is a dummy that takes the value of 1 in case the minister is a woman; this will allow to check whether women are reserved different treatments than men in cabinet offices. An *experienced* dummy takes controls for previous ministerial roles in the past fulfilled in the past by the minister. I assume firing a veteran is more costly, for a party leader, that replacing a novice. *Education* controls for ministers with a college degree. Country- fixed effects could not be introduced for the almost perfect multicollinearity with several variables.

I run the "termination" and the "redistribution event" models more than once: testing combinations of the *change* variables, either separately and interacted, in order to control for their multicollinearity. Results are reported in Table 4.1.

Table 4.1. The effect of party popularity on ministerial duration.

	Termination		Redistribution	
	Model 4.1	Model 4.2	Model 4.3	Model 4.4
Bargaining environment				
Change in the exit option (party)	0.573 *** (0.147)	0.668 *** (0.162)	0.671 *** (0.119)	0.739 *** (0.128)
Change in the exit option (rest of cabinet)	0.500 *** (0.162)	0.329 * (0.187)	0.573 *** (0.132)	0.455 *** (0.147)
Change (party) × Change (rest)		0.0199 *** (0.008)		0.014 ** (0.006)
Prime ministers' dismissal powers	2.312 *** (0.594)	1.895 *** (0.532)	2.762 *** (0.533)	2.303 *** (0.499)
Number of government parties	–0.446 (0.717)	–1.159 (0.727)	–0.300 (0.685)	–0.929 (0.711)
Number of events	–0.234 *** (0.061)	–0.256 *** (0.064)	–0.192 *** (038)	–0.205 *** (0.040)
Postelection	–0.814 * (0.429)	–0.618 (0.437)	–1.272 *** (0.294)	–1.137 *** (0.302)
Minority	1.880 *** (0.370)	1.952 *** (0.368)	2.338 *** (0.289)	2.396 *** (0.289)
Oversized	3.413 (2.065)	5.314 ** (2.145)	2.737 (1.951)	4.297 ** (2.037)
Individual minister				
Prime minister's party	–0.336 (0.299)	–0.749 ** (0.340)	–0.571 *** (0.242)	–0.857 *** (0.273)
Portfolio relevance	–1.192 *** (0.334)	–1.225 *** (0.338)	–1.060 *** (0.255)	–1.089 *** (0.258)
Age	0.041 ** (0.017)	0.042 ** (0.017)	0.014 (0.013)	0.015 (0.013)
Gender	–0.107 (0.295)	0.017 (0.295)	–0.118 (0.226)	–0.052 (0.227)
Previous experience	0.030 (0.288)	0.130 (0.289)	0.252 (0.223)	0.275 (0.223)
College degree	0.646 * (0.383)	0.630 * (0.380)	0.311 (0.270)	0.312 (0.269)
Log-likelihood	–439.575	–435.863	–697.968	–695.089
N (spells)	453	453	453	453
N (events)	57	57	93	93
N (observations)	19900	19900	19900	19900

* $p < 0.1$. ** $p < 0.05$. *** $p < 0.01$.

The coefficient corresponding to the change in the party's exit option is significant and of the expected sign. This confirms us that the more the exit option of a party changes, with respect to the conditions at the beginning of the legislature that made the cabinet possible, the higher the probability to observe a disequilibrium of power among coalition parties, both in the form of a ministerial removal, or the broader case of a reallocation of policymaking prerogatives. The same conclusions are backed by the *change* coefficient corresponding to other government parties, but its significance is weakened by the high multicollinearity with the main variable. These results are however perfectly in line with the predictions from the empirical test in Chapter 3.

Prime minister's dismissal power is one of the strongest and most significant effects in all the models reported. Its sign tells us that a prime minister provided with stronger dismissal and removal powers will use this power instrumentally. When the head of the cabinet can remove a minister unilaterally, ministerial tenures are significantly more uncertain. The *number of government parties* didn't reach statistical significance in any of the models provided. The same results have been reached by other measures of coalition heterogeneity, such as ideological range based on the Manifesto Policy Dataset (which was excluded because of its excessive multicollinearity with other covariates). It seems that bargaining variables outperform the ones capturing ideological distance. The *number of events* fulfills expectations: the occurrence of an alteration of ministerial prerogatives becomes less likely each time such an event happens. The *postelection* coefficient corroborates the assumption that a layoff or a change in ministerial prerogatives is a tool for handling government crises that becomes more useful when other options, such as a cabinet substitution, are not available for incumbent parties.

The *minority* status of a government coalition is a very strong predictor, suggesting that structurally unstable governments must resort to changing the allocation of ministerial prerogatives as a correcting measure in order to grant the survival of the cabinet. The *oversized* coefficient reached similar conclusions, but its impact is much less significant. Oversized coalitions seem to

lead to governing agreements on the allocation of policymaking prerogatives that are harder to modify throughout the course of the legislature, granting a greater stability of ministerial tenures Among the individual-level variables, the dummy corresponding to the *prime minister's party* is one of the strongest effects. This tells us that ministers from the same party of the head of the cabinet are protected by the greater bargaining powers that office grants. The *relevance of the portfolio* is another of the strongest effects, and its effect is unquestionably clear: firing the minister of turism is not like firing the minister defense. The removal of important ministers is comparatively harder, since it would represent a great shock for the stability of the cabinet. Other individual variables do not show particularly significant impacts on the dependent variable. *Age* and *college degree* have an impact only in termination models. Older and more educated ministers seem to be more likely to be fired from their office, but their significance disappears when a broader definiton of "event" is employed. In the end, it doesn't seem that demographics played an imporant empirical role.

Party Popularity and Ministerial Tenure

The previous paragraph, as well as the empirical tests in Chapter 3, were based on a measure of the change in the parties' exit option, which was operationalized as an absolute difference between the vote shares at the last election, and the opinion polls' predictions throughout the legislature. At this point, it is of some interest to check how the variation in parties' popularity associates with the length of ministerial tenures. According to the the bargaining model reported herein, an impopular party is more likely to be forced to make concessions to other parties, such as accepting a redistribution of policymaking powers, or to remove a minister from office. The following

hypotheses can thus be formally expressed.

(H4.3) Increasingly unpopular parties are more likely to be forced to fire individual ministers.

(H4.4) Increasingly unpopular parties are more likely to be forced to accept reallocation of policymaking prerogatives.

At this point, I have repeated the previous test on the same data, but substituting the *change* variables with alternative ones. The first, and most important, is a *party's popularity drift*, calculated as a difference between initial vote shares and the opinion polls' predicted shares, this time not in absolute value. This variable assumes a negative sign when the party is less popular with respect of the beginning of the legislature, and a positive sign when opinion polls predict a higher vote share. I expect that the more a party is unpopular, the weaker it will be in the coalition bargaining game. A weak party might be forced to fire a minister, or to accept a reallocation of policymaking prerogatives in the cabinet.

I then added a second variabile that is analogous, but not identical to the ones previously employed, called *change in the coalition's exit option*, that corresponds to a change variable as specified above, but computed on the whole government coalition. The motivation behind the introduction of this variable is that the choice of a party to fire a minister, or to review the distribution of ministerial prerogatives, does not depend from that party alone. When the turbulence in popularity for the whole cabinet raises, it must be expected that more coalition members will ask for a reallocation of policymaking powers. In such cases, the pressure on unpopular parties for portfolio concessions shall increase.

Table 4.2. The effect of party popularity on ministerial duration.

	Termination		Redistribution	
	Model 4.5	Model 4.6	Model 4.7	Model 4.8
Bargaining environment				
Party's popularity drift	–0.082 * (0.046)	–0.348 *** (0.064)	–0.119 *** (0.040)	–0.351 *** (0.052)
Change in the exit option (coalition)	0.005 (0.037)	0.118 *** (0.034)	0.021 (0.035)	0.139 *** (0.029)
Party's popularity drift × Change (coalition)		0.017 *** (0.003)		0.017 *** (0.003)
Prime ministers' dismissal powers	1.896 *** (0.650)	1.564 *** (0.496)	2.649 *** (0.631)	1.923 *** (0.445)
Number of government parties	–0.478 (0.699)	–1.631 ** (0.714)	–0.151 (0.678)	–1.506 ** (0.686)
Number of events	–0.233 *** (0.063)	–0.304 *** (0.071)	–0.179 *** (0.038)	–0.225 *** (0.043)
Postelection	–0.777 * (0.434)	–0.348 (0.455)	–1.283 *** (0.298)	–0.944 *** (0.310)
Minority	1.621 *** (0.367)	1.628 *** (0.364)	2.101 *** (0.287)	2.136 *** (0.284)
Oversized	4.267 ** (2.107)	6.024 *** (2.157)	3.291 * (1.987)	5.120 ** (1.995)
Individual minister				
Prime minister's party	–0.192 (0.295)	–0.860 ** (0.333)	–0.406 *** (0.236)	–1.040 *** (0.267)
Portfolio relevance	–1.060 *** (0.326)	–1.024 *** (0.331)	–0.944 *** (0.248)	–0.949 *** (0.255)
Age	0.041 ** (0.017)	0.040 ** (0.016)	0.013 (0.013)	0.016 (0.012)
Gender	–0.027 (0.301)	0.181 (0.303)	–0.049 (0.231)	0.093 (0.231)
Previous experience	–0.012 (0.287)	0.071 (0.294)	0.134 (0.223)	0.193 (0.225)
College degree	0.698 * (0.381)	0.589 (0.379)	0.350 (0.269)	0.297 (0.267)
Log-likelihood	–446.274	–430.767	–708.382	–687.100
N (spells)	453	453	453	453
N (events)	49	49	82	82
N (observations)	19900	19900	19900	19900

* p < 0.1. ** p < 0.05. *** p < 0.01.

I expect higher values of this variable to correspond to a shorter length of the ministerial teure, and to a higher probability of power redistribution among cabinet members. Given that both the variables introduced are based on how parties' popularity changes, I added an interacton term to the test, in order to control for their mutual influence.

As shown in Table 4.2, the hypotheses are confirmed: unpopular parties are more likely to make concessions to other coalition partnes, and large variations of the exit option of a coalition negotiation correspond to greater concessions from unpopular parties.

The two main variables fulfilled expectations either when tested independently, and after controlling for reciprocal influence. All other variables confirm what found up to now.

A minister has higher probability of keeping office and prerogative when the prime minister doesn't own strong dismissal powers, when the government is a direct outcome of general elections, and at its most stable status (minimum winning), when he or she belongs to the prime minister's party, and when owns a very relevant portfolio position. The *number of government parties* is not significant. This seems to be due to the combination of the main variable, that already capture the litigiosity of the coalition. *Gender*, *previous experience* and *degree* are not significant, or very weakly significant on the whole, and don't allow to reach any grounded generalization. *Age* seems to affect the likelihood of demotions alone.

These empirical tests added new explanations of ministerial duration to the literature. Moreover, it brought further evidence in favor of the formal model presented in Chapter 3, showing how the variation in the allocation of ministerial prerogatives can be thought as a currency between coalition parties, who negotiate on policy outcomes on the basis of their electoral expectations.

Conclusions

The conclusions taken from the formal model reported in the previous chapter have been extended in order to link the study of coalition bargaining with the literature on ministerial tenure. I employed survival analysis techniques with time-varying covariates using voting intention trends, and explained the probability of ministerial termination on the basis of the variations in the exit option of a bargaining game between coalition parties.

Large shifts in the incumbents' exit option are associated with a greater probability of a ministerial layoff, and of a redistribution of policymaking prerogatives within the cabinet members. These events are more probable when the prime minister owns greater dismissal powers, when a minister doesn't belong to the prime minister's party, when he or she holds important portfolios, and when few alteration of ministerial prerogatives already occurred. Moreover, they tend to happen more frequently in case of those postelection coalitions that deviate from the minimum winning status, especially in case of minority governments. The dismissal of a minister or an alteration of his or her prerogatives seems thus to have a corrective effect, to which parties can recur in order to prolong the duration of the cabinet.

It seems that, in order to explain ministerial tenure, demographics do not count for consensual coalition governments, where ministerial duration is the outcome of a negotiation within multiparty cabinets. Previous researches showed their relevance, based on evidence from (completely, or at least partially) Westminster systems, where the prime minister can terminate a ministerial career without any obstacle, and the coalition dynamics analyzed here are not at play. This might represent a significant discovery regarding the differences between consensual and majoritarian systems.

Concluding Remarks

The opportunistic timing of elections is one of the most fundamental phenomena in the life of parliamentary political systems. The present thesis was an attempt to deepen our knowledge of it; what follows is a list of its main findings.

I started proposing a new valence theory of election timing, describing the popularity toll of manipulative election timing as negative shock in the valence capital of an incumbent. Since the variations in the Stokes region change as the ideological distance between adjacent competitor changes, spatial proximity among parties became the main predictor of this cost. The new valence theory sketched in Chapter 2 is able to describe variations in this popularity toll. This explanation is simpler and alternative to the Bayesian hypothesis of Smith [2004], assuming voters to interpret election calling as a signal of a future economic downturn, which is admittedly controverse.

Moreover, my research provided a solution to an ongoing debate in the field on the magnitude of the popularity cost of calling a snap election. A case study of the 2000 Canadian election showed why Blais et al. [2004] didn't find evidence of this cost, whil Smith did [2003, 2004]. With the first comparative test ever produced on the topic I showed that their conclusions are just specific cases of a general phenomenon. This represents the potential solution of a debate that was open from at least fourteen years.

Later, I presented a bargaining model of election timing, in which I modeled coalition parties' negotiations on public policies. Coalition government was described as charachterized by a continuous negotiation on public policies among parties, with the outcome of this game depending

from the electoral expectations of the players. Any time a party can call a snap election, paying a valence cost, or extorting concessions from other coalition partners in case they are electorally advantaged. The game was not of a static type, as for other multiparty models: I introduced time and showed its effects on the outcome of the negotiation. On the empirical side, I produced the first survival model of cabinet termination with time-varying measures based on voting intention trends. I was able to show how measured of the change in parties' exit option successfully capture the probability of anticipated cabinet termination.

Once the model was tested, I applied its main insights on a corollary research on the length of ministerial tenure. Even in this case, a duration model with time-varying measures based on opinion polls was run for the first time in the respective literature. Results supported the thesis that the dismissal of a minister, or the alteration of his or her policymaking powers, can be explained as a currency in a coalition bargaining game.

I believe that linking the topic of opportunistic election timing to valence models of party competition represents the most significant contribution of the present thesis. But there is still much to be understood. Formal theories of election timing shall be assimilated, through the application of valence models, into larger theories of party competition being able to account for other phenomena that have remained theoretically isolated up to now, such as the strategic location of the candidates, or policymaking.

I hope my contributions might push towards a greater and greater integration of the literature of election timing with other and new branches of the political science research.

Appendix

Appendix A. Demonstration of formula (2.2).

With reference to the two-party model from Figure 2.1, and given the voters' utility functions as defined by equation (2.2).

In order to derive the formula (2.2), the cutoff point between A and B must be found first. This can be done by finding the meeting point of the two utility curves represented in Figure 2.2, equating:

$$-(A-x)^2+\nu_A=-(B-x)^2+\nu_B \quad ,$$

where A and B represent the two parties' ideal points, respectively.

The equation solves:

$$(A-x)^2-\nu_A=(B-x)^2-\nu_B \quad ,$$

$$A^2-2Ax+x^2-\nu_A=B^2-2Bx+x^2-\nu_B \quad ,$$

$$2Bx-2Ax=B^2-A^2-\nu_B+\nu_A \quad ,$$

$$2\,x(B-A)=B^2-A^2-\nu_B+\nu_A \quad ,$$

$$x=\frac{B^2-A^2-\nu_B+\nu_A}{2(B-A)} \quad .$$

This formula individuates the cutoff, or indifference point between candidates A and B. Following the proximity voting assumption, all the voters on the left of the cutoff point prefer candidate A, while all the voters on the right of the cutoff point prefer candidate B.

At this point, let us hypothesize, for candiate A, a negative shock in her valence capital of magnitude $\epsilon=(\nu_A-\overline{\nu_A})$, where ν_A represents A's valence level before the cost, and $\overline{\nu_A}$ represents valence capital after the cost. A valence shock, alterating the position of the cutoff point, allows us to calculate the width of the variation of the Stokes region (the black segments in Figures [] and []), in the following way:

$$\Delta_A=\frac{B^2-A^2-\nu_B+\nu_A}{2(B-A)}-\frac{B^2-A^2-\nu_B+\overline{\nu_A}}{2(B-A)} \quad ,$$

which solves:

$$\Delta_A=\frac{B^2-A^2-\nu_B+\nu_A-B^2+A^2+\nu_B-\overline{\nu_A}}{2(B-A)} \quad ,$$

$$\Delta_A=\frac{\nu_A-\overline{\nu_A}}{2(B-A)} \quad .$$

Recalling that $\epsilon = (\nu_A - \overline{\nu_A})$, the last equation can be rewritten as formula (2.2).

Appendix B. Structure of the dataset for Chapter 2.

Table B.1. Structure of the dataset for Chapter 1.

Country	Election	Parties included
Australia	1987	ALP
	1990	ALP
	1993	ALP
	1996	ALP
	1998	LPA, NPA
	2004	LPA, NPA
	2007	LPA, NPA
	2010	ALP
	2013	ALP
Austria	1995	SPO, OVP
	2002	FPO, OVP
	2006	FPO, OVP
	2008	SPO, OVP
Canada	2000	LPC
	2004	LPC
	2006	LPC
	2008	CPC
Denmark	2001	SD, RV
	2005	V, KF
	2007	V, KF
Finland	2011 *	KOK, KESK, VIHR
Germany	2005	SPD, B90
Ireland	1977 *	ILAB, FG
	1981 *	FF
	1982 *	FF
	1992 *	FF, PD
	1997	DL, ILAB, FG
	2007	FF
	2011	FF
Portugal	2005 *	CDS, SDPP
	2011	PSP
Spain	2000	PP
	2004	PP
	2008	PSOE
	2015	PP
United Kingdom	1950	LAB
	1951	CON
	1955	CON
	1959	CON
	1964	CON
	1966	LAB
	1970	LAB

1974-02	CON
1974-10	LAB
1979	LAB
1983	CON
1987	CON
1992	CON
1997	CON
2001	LAB
2005	LAB
2010	LAB
2015	CON, LD

*: only available for Model 2.2.

Table B.2. Party codes.

Country	Code	Party name
Australia	ALP	Australian Labour Party
	LPA	Liberal Party of Australia
	NPA	National Party of Australia
Austria	SPO	Social Democratic Party of Austria
	OVP	Austrian People's Party
	FPO	Freedom Party of Austria
Canada	LPC	Liberal Party of Canada
	CPC	Conservative Party of Canada
Denmark	SD	Social Democratic Party
	RV	Radical Left
	V	Liberals (*Venstre*)
	KF	Conservative People's Party
Finland	KOK	National Coalition Party
	KESK	Centre Party
	VIHR	Green League
Germany	SPD	Social Democratic Party
	B90	Greens
Ireland	FF	Soldiers of Destiny (Fianna Fail)
	FG	Family of the Irish (Fine Gael)
	ILAB	Irish Labour Party
	PD	Progressive Democrats
	DL	Demcoratic Left
Italy	PD	Democratic Party
	NCD	New Center-Right
	SC	Civic Choice
	UDC	Union of Center Democrats
	PDL	The Peopole of Freedom
	LN	Northern League
Netherlands	CDA	Christian Democratic Appeal
	LPF	Pim Fortuyn List

	VVD	People's Party for Freedom and Democracy
	D66	Democrats 66
	PvdA	Labour Party
	CU	Christian Union
Portugal	PSP	Socialist Party
	CDS	Democratic and Social Center
	SDPP	Social Democratic Party
Spain	PP	Popular Party
	PSOE	Spanish Socialist Workers' Party
United Kingdom	LAB	Labour
	CON	Conservatives
	LD	Lib-dems

Appendix C. Opinion Polls Sources.

Australia

- The Roy Morgan Research website (http://www.roymorgan.com).

  More specifically, the Primary Voting Intention Long-Term Trend:

  http://www.roymorgan.com/morganpoll/federal-voting/primary-voting-intention-trend-1901-2016

- *The Australian*'s website (http://www.theaustralian.com.au), Australian newspaper published since 1964.

  More specifically, an opinion poll archive can be accessed at:

  http://polling.newspoll.com.au.tmp.anchor.net.au/cgi-bin/polling/display_poll_data.pl

Austria

- Opinion polls series have been kindly provided by Francesco Zucchini.

Canada

- Laurier Institute for the Study of Public Opinion and Policy:

  http://portal.lispop.ca/index.html

- *Elections* website, administered by Andrew Heard, Simon Fraser University:

  https://www.sfu.ca/~aheard/elections/index.htm

- National Post's 2015 poll tracker:

  (http://nationalpost.com/news/politics/canadian-election-2015-poll-tracker)

Denmark

- Gallup Denmark's website (http://gallup.dk).

More specifically, the Political Index at: http://gallup.dk/statistik/politisk-index

Germany

- http://www.wahlrecht.de/umfragen/index.htm

Ireland

- IOPA (Irish Opinion Poll Archive):

  (http://www.tcd.ie/Political_Science/IOPA/)

Italy

- "Sondaggipoliticoelettorali", an Italian Government's website that collects politically relevant opinion polls (http://www.sondaggipoliticoelettorali.it).

Netherlands

- Peil.nl (pollster):

  (https://home.noties.nl/peil/)
- Dutch opinion polls database:

  (https://www.allepeilingen.com)

Portugal

- Grupo Marktest website: (http://www.marktest.com/wap/).

  More specifically: (http://www.marktest.com/wap/a/p/id~112.aspx).

Spain

- Datos Politicos website: (http://datospoliticos.com/intenciones/1)

- Single opinion polls were accessed at the following pollsters' websites
  - January 16, 2004: (https://web.archive.org/web/20050924172746/http://www.cadenaser.com/static/pulsometro/anteriores/encuesta_040119.htm)
  - December 26, 2007: (http://www.elmundo.es/elmundo/2007/graficos/dic/s4/macroencuesta.html)
  - December 22, 2007: (http://www.expansion.com/2007/12/22/economia-politica/politica/1071615.html)
  - December 17, 2007: (https://web.archive.org/web/20071217145255/http://www2.elplural.com/politica/detail.php?id=16287)
  - October 2, 2015: (http://www.publico.es/politica/subidon-ciudadanos-27-s-acerca.html)
  - September 28, 2015: (https://web.archive.org/web/20150930191548/http://www.tnsglobal.es/press-release/el-pp-aventaja-en-7-puntos-al-psoe-en-expectativas-de-voto-poco-más-de-3-meses-de-las-)

United Kingdom

- PollBase: an opinion poll database built by Mark Pack: https://www.markpack.org.uk/opinion-polls/

Appendix D. Structure of the Dataset on Cabinet Durability.

Table D.1. Cabinets and termination dates for Chapter 3.

Country	Cabinet	Coalition	Date Start (YYY-MM-DD)	Termination Event (YYY-MM-DD)
Austria	Vranitzky IV	SPO, OVP	1994-11-29	1995-10-13
	Vranitzky V	SPO, OVP	1996-03-12	1997-01-18
	Klima I	SPO, OVP	1997-01-28	(censored obs.)
	Schuessel I	OVP, FPO	2000-02-04	2002-09-09
	Schuessel III	OVP, FPO	2003-02-28	2005-04-04
	Schuessel IV	OVP, BZO	2005-04-05	2006-07-14
	Gusenbauer	SPO, OVP	2007-01-11	2008-07-07
	Faymann I	SPO, OVP	2008-12-02	(censored obs.)
Denmark	Rasmussen N IV	SD, RV	1998-03-11	2001-10-31
	Rasmussen F I	V, FK	2001-11-27	2005-01-18
	Rasmussen F II	V, KF	2005-02-18	2007-10-24
	Rasmussen F III	V, KF	2007-11-23	2009-04-04
	Rasmussen L I	V, KF	2009-04-05	2011-08-11
	Thorning-Schmidt I	SD, RV, SF	2011-10-02	(censored obs.)
Italy	Berlusconi IV	PDL, LN	2008-05-08	2011-11-08
	Letta I	PD, PDL, SC, UDC	2013-04-27	2013-11-18
	Letta II	PD, NCD, SC, UDC	2013-11-18	2014-02-22
	Renzi	PD, NCD, SC, UDC	2014-02-22	(censored obs.)
Netherlands	Balkenende I	CDA, LPF, VVD	2002-05-15	2002-10-16
	Balkenende III	CDA, VVD, D66	2006-11-22	2006-07-05
	Balkenende V	CDA, PvdA, CU	2007-02-22	2007-02-22
	Rutte I	VVD, CDA	2010-10-14	2012-04-23
	Rutte III	VVD, PvdA	2012-11-15	(censored obs.)

Appendix E. Duration Models of Cabinet Durability with Country-Fixed Effects

Table E.1. Cabinet duration models with country-fixed effects.

	Pooled		Early election		Substitution	
	Model B.1	Model B.2	Model B.3	Model B.4	Model B.5	Model B.6
Bargaining environment						
Changes in the exit option (party)	0.290 *** (0.097)	0.415 *** (0.117)	0.352 *** (0.128)	0.448 *** (0.166)	0.086 (0.248)	0.133 (0.254)
Changes in the exit option (others)	0.161 ** (0.076)	0.191 ** (0.076)	0.277 *** (0.098)	0.304 *** (0.104)	-0.410 * (0.223)	-0.399 * 0.220
Change (party) × Change (others)	-0.015 * (0.009)	-0.029 ** (0.012)	-0.014 *** (0.011)	-0.027 * (0.016)	-0.040 (0.034)	-0.044 (0.034)
Number of government parties	3.236 *** (1.062)	2.342 (1.558)	7.833 *** (1.865)	8.202 *** (2.499)	-12.488 (0.003e-3)	-15.416 (14852.208)
Ideological dispersion (coalition)	0.309 *** (0.080)	1.306 *** (0.238)	0.823 *** (0.170)	2.265 *** (0.384)	-0.172 (0.153)	-0.989 (1.305)
Ideological dispersion (legislature)		-1.249 *** (0.296)		-1.442 *** (0.312)		1.006 (1.549)
Minority	5.757 *** (1.130)	1.115 (1.594)	13.373 *** (2.505)	10.824 *** (3.015)	-16.946 (0.004e-5)	-12.949 (20785.520)
Oversized	-4.237 * (2.229)	-2.109 (2.725)	-31.147 (5136.445)	-34.863 (8692.987)	33.391 (3.175e14)	33.621 (20785.520)
Country effects						
Austria	3.856 *** (1.026)	1.292 (1.596)	5.709 *** (1.211)	2.951 * (1.580)	8.430 (4582.569)	10.167 (12294.846)
Denmark	-4.887 ** (1.984)	-1.858 (2.496)	-16.073 *** (3.961)	-19.146 *** (5.249)	27.802 (1.186e12)	24.066 (42050.830)
Italy	-6.675 ** (2.667)	-6.391 * (3.472)	-14.408 *** (4.049)	-15.746 *** (5.235)	23.758 (2.079e10)	32.736 (50677.055)
Likelihood-ratio test	52.16	67.34	91.78	114.2	16.8	17.26
Number of events	22	22	17	17	5	5
N	3290	3290	3290	3290	3290	3290

* p < 0.1. ** p < 0.05. *** p < 0.01.

Appendix F. Parametric Models of Cabinet Durability

Table F.1. Parametric Versions of Model 3.1.

	Model F.1 (Weibull)	Model F.2 (Exponential)	Model F.3 (Log-normal)
Bargaining environment			
Changes in the exit option (party)	-0.135 (-3.02)	-0.263 (-3.10)	-0.173 (-2.74)
Changes in the exit option (others)	-0.071 (-2.05)	-0.143 (-1.99)	-0.085 (-1.96)
Change (party) × Change (others)	0.007 (1.69)	0.013 (1.58)	0.411 (2.57)
Number of government parties	-1.110 (-2.35)	-1.791 (-2.05)	-1.378 (-2.37)
Ideological dispersion (coalition)	-0.090 (-3.16)	-0.138 (-2.48)	-0.088 (-2.56)
Minority	-2.096 (-5.33)	-3.157 (-4.06)	-2.313 (-4.22)
Oversized	1.365 (1.46)	2.817 (1.50)	0.962 (0.83)
Institutional effects			
Unanimity	-5.073 (-3.73)	-7.517 (-2.85)	-6.115 (-3.46)
Elected Head of the State	7.235 (2.98)	10.708 (2.26)	9.158 (2.93)
Investiture vote	3.872 (2.64)	6.344 (2.29)	5.077 (2.74)
Intercept	15.720 (9.16)	22.162 (7.72)	17.921 (8.279)
Nuber of events	22	22	22
N	3290	3290	3290

* $p < 0.1$. ** $p < 0.05$. *** $p < 0.01$.
Note: Z-tests in parentheses.

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